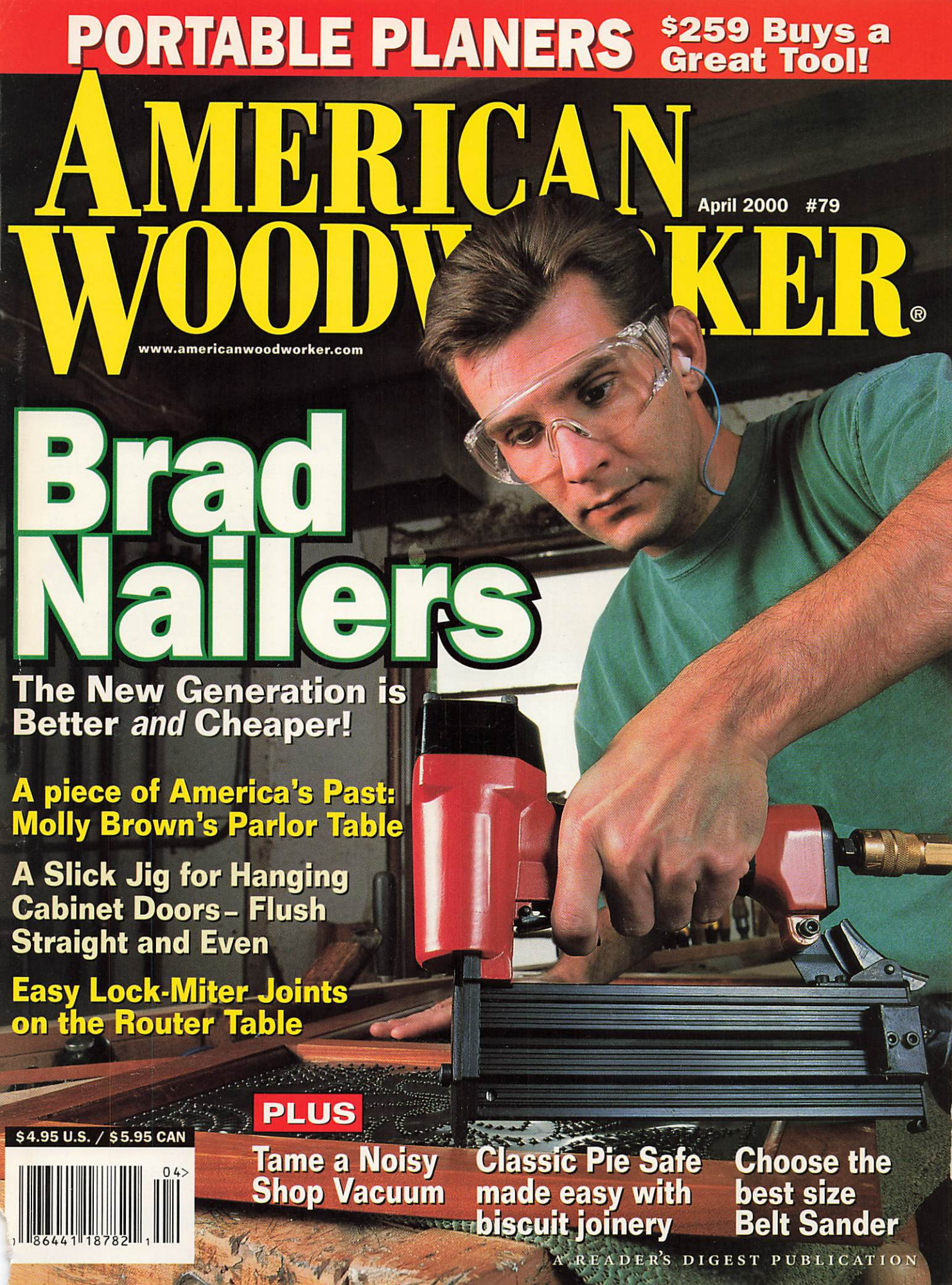
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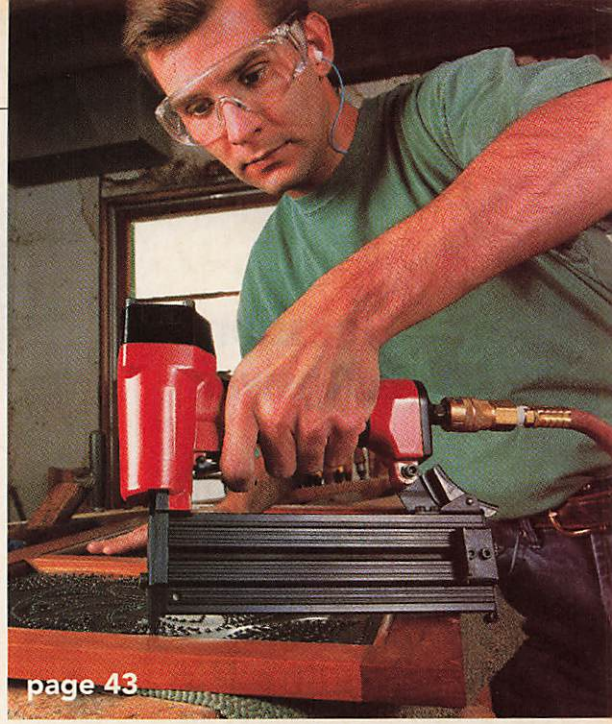
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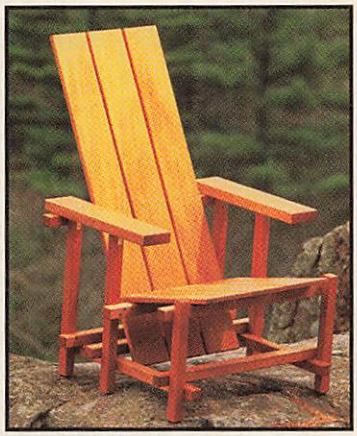
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A simple, unique technique for making these strong, attractive joints.

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Build this icon of modern furniture design.


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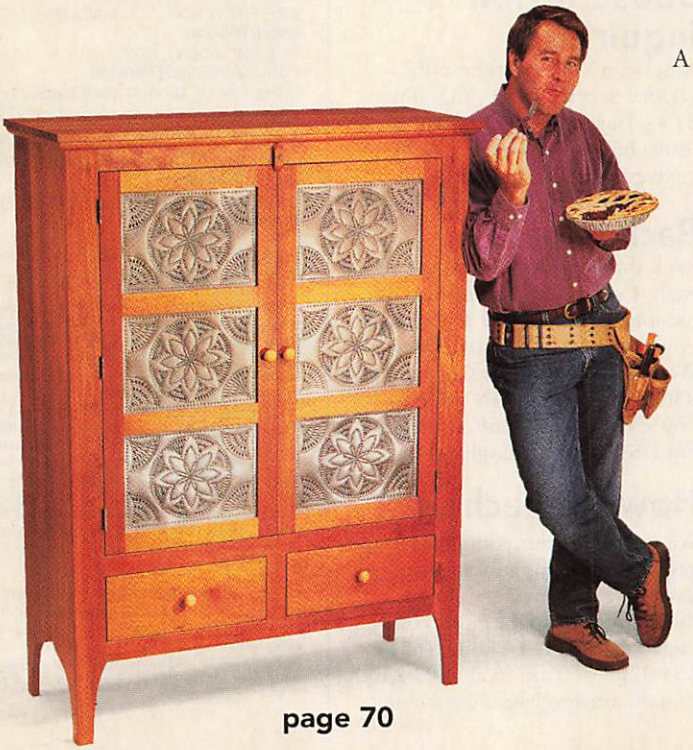

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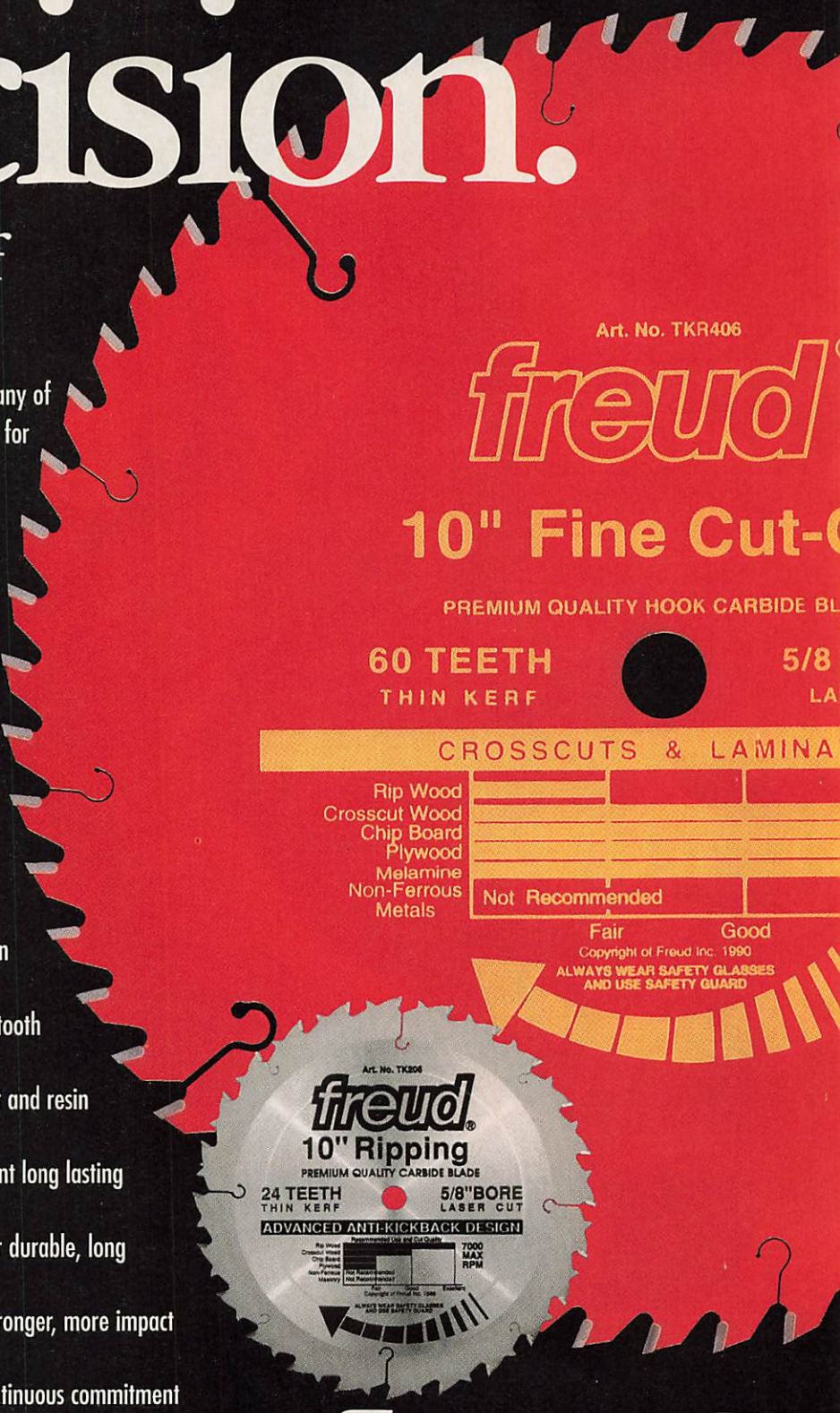
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Edited by **Dave Munkittrick**

Question & Answer

Recreating the Details

Q. I picked up a charming but slightly damaged table at a yard sale. I know how to refinish the piece but part of the carved detailing is missing on one of the legs. How can I replicate this unusual piece of wood? I've never done any carving and I don't have the tools for it.

Howard Langthrop
Peoria, IL

A. Carved details are prone to breakage, as any furniture restorer knows. Carving the replacement out of wood is the best approach, but don't let a lack of carving skills stop you from tackling this repair. Because carved details are often repetitive, a duplicate of the missing piece can be used to form a mold. From the mold you can make a casting of the missing detail.

We used salvaged door casing with some fantastic carvings to demonstrate the process, but it will work just as well on your table leg. Here's what to do:

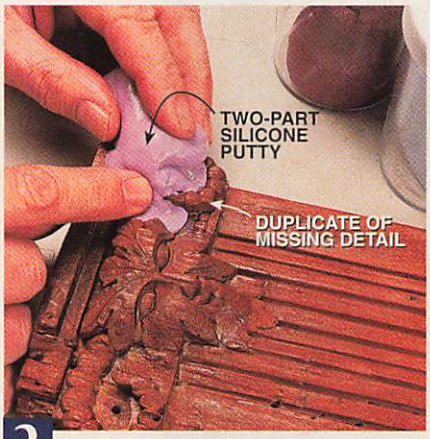
1. Create a clean, flat area where the piece is broken or missing. Use wood filler to even out any holes or gouges (Photo 1).
2. Find a matching piece of the detailing on which to form the mold. Then spray the surface with PPS-Porous Pattern Sealer to prevent the mold from sticking (see Sources, p. 10).
3. Thoroughly mix equal amounts of the two-part RTV silicone putty (see Sources, p. 10). The putty is safe for skin contact, so go ahead and use your fingers!
4. Press the putty firmly around the matching piece to form the mold (Photo 2). Let it set for 40 to 55 minutes, then press your fingernail into the edge of the mold. If you see a mark, let the mold set longer; if there's no mark, carefully peel the mold off the form.
5. Use Minwax's catalyzed wood filler or Bondo auto-body filler and slightly overfill the mold (Photo 3). Use a small stick to work the filler into the details.
6. After 15 minutes remove the casting

THE COMPLETED REPAIR

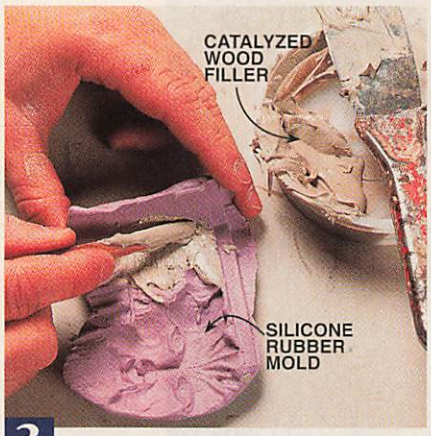




1 **SMOOTH AND FILL** the area around the missing part.



2 **MAKE A MOLD** with silicone putty using an undamaged part for the shape.

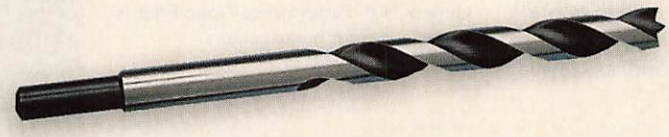


3 **FILL THE MOLD** completely with catalyzed wood filler.

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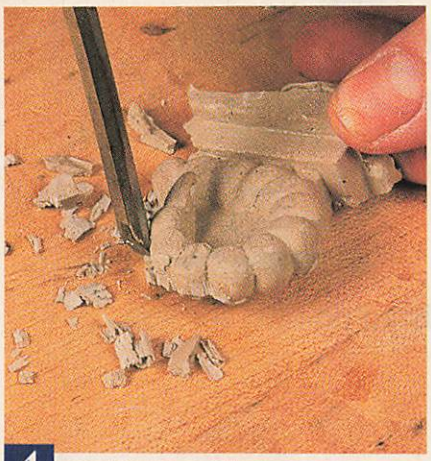
from the mold and carve away the excess material (Photo 4).

7. Refer to the spot where the casting will be attached to create the mating shape. Clean the edges and cut to fit with a knife or a chisel. Then sand with 150-grit sandpaper to eliminate any rough or high spots in the casting. Take your time or you could sand off the fine details. Continue with 180- and 220-grit sandpaper.

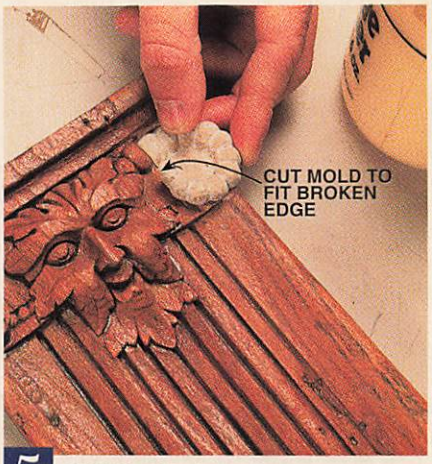
8. Glue the replacement in place with ordinary wood glue (Photo 5). Take a little bit of wood filler and smooth it into any gaps until the new piece fits seamlessly. Use some extra-fine sandpaper where necessary.

9. The last step is to blend in the repair by staining and, if necessary, painting in grain lines. If you want more on this step, see AW #73, p. 100.

Our door casing looks as good as new—your table will too!



4 **CLEAN UP THE CASTING** and cut to fit with an X-Acto knife or chisel.



5 **GLUE ON** the replacement piece. Then stain and glaze to match.

Sources

Available from Micro-Mark, (800) 225-1066:
Silicon putty, #81853, $27.50
Porous Pattern Sealer, #82101, $5.95

Minwax High-Performance Wood Filler is available at most home centers.

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Paint-Filled Pores

Q. After stripping about 10 layers of paint off an old oak washstand I was left with paint-filled pores. Should I sand down the top until the paint disappears?

John Riach
Greensboro, NC

A. Put your sander away, there's an easier way!

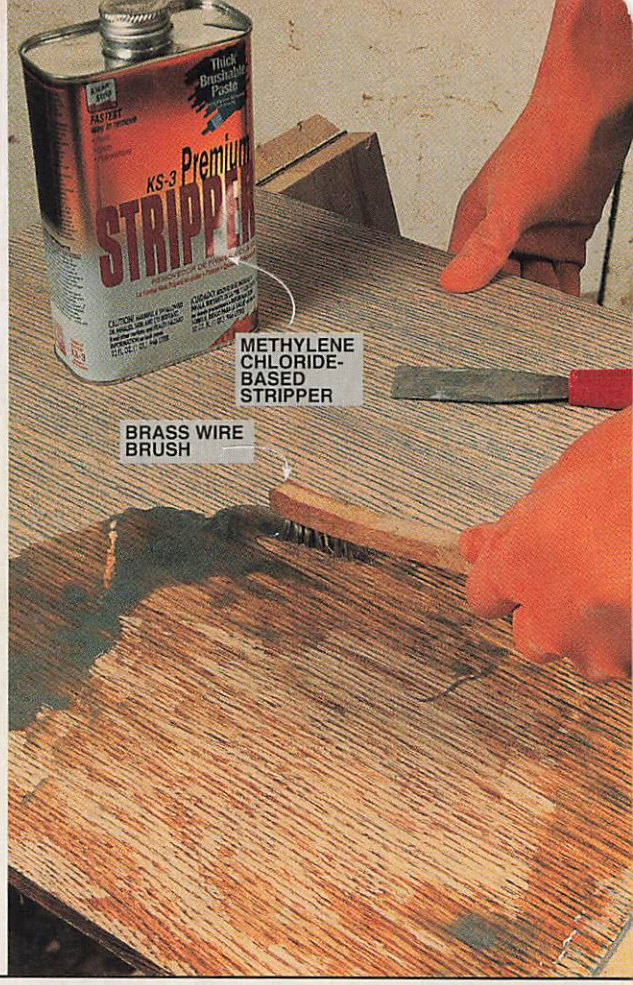
Use a methylene chloride-based stripper (available at most home centers—pick the one with the highest concentration of methylene chloride). These strippers work from the bottom up and can loosen the paint in the pores. To free up the trapped paint, use a brass wire brush and scrub the surface *with the grain*. The small diameter brass wires pop the loosened paint out of the pores without harming the wood.

CAUTION!

Be sure to use these strippers with good ventilation and wear gloves and eye protection (see AW #77, p. 12). Work outdoors or use a fan to take the fumes outside. Remember that methylene chloride fumes are heavier than air and will accumulate near the floor.

Sources

Brass brushes: Constantine's, (800)223-8087; 6 in., #BRS36 $2.60; 12-7/8 in., #29BRS $7.95.



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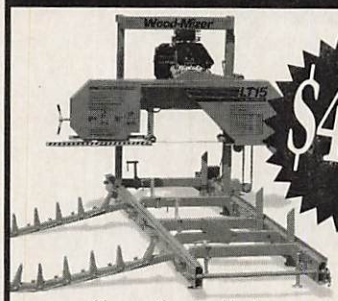
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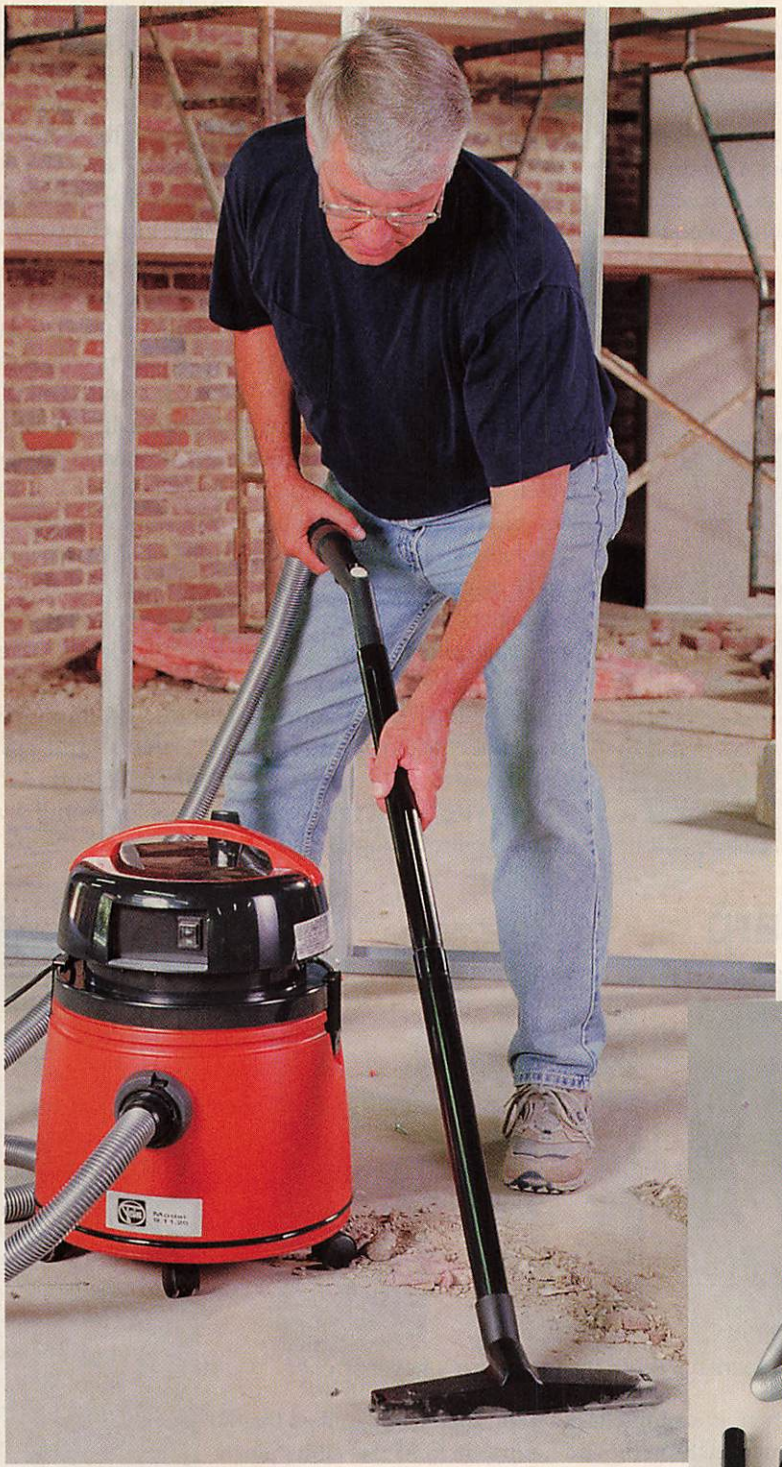
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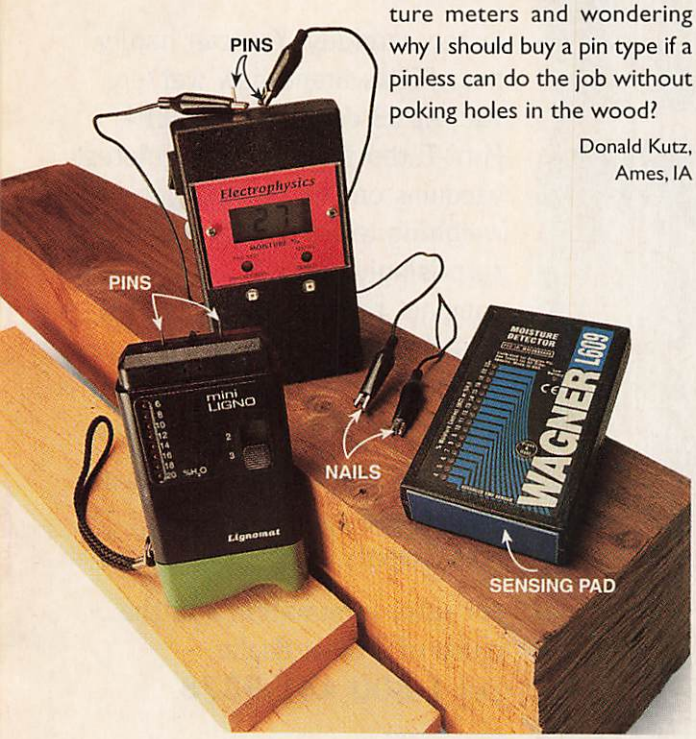
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Fein

Moisture Meters

Q. I've been looking at moisture meters and wondering why I should buy a pin type if a pinless can do the job without poking holes in the wood?

Donald Kutz,
Ames, IA



A. If you buy your wood already surfaced, then a pinless meter will work fine. If you buy your wood rough or if you dry your own wood, a pin-type meter is the way to go.

A pinless meter's greatest asset is its ability to scan over an entire board or even a finished piece of furniture, without leaving a mark. Pinless meters are also unaffected by temperature, which eliminates the conversion charts needed with pin-type meters.

The biggest drawback to pinless meters is the flat, smooth surface required for the sensing pad. This means they can't be used effectively on rough-sawn lumber without first planing a flat area.

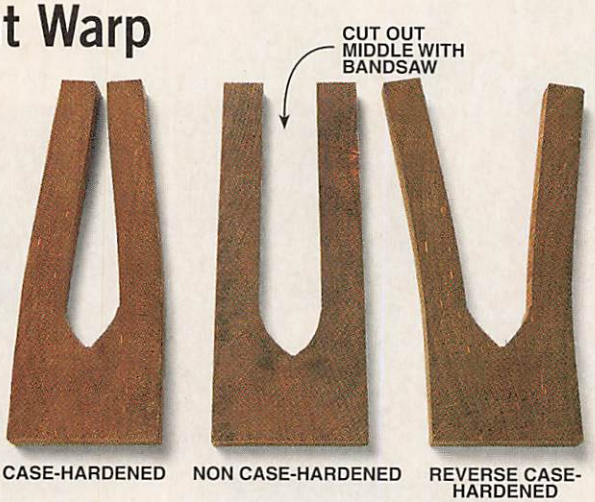
Pin-type meters work equally well on rough or surfaced wood. These meters can also be adapted to take accurate readings at depths beyond their normal range. Simply drive uncoated nails to the depth you wish to measure and use alligator clips to connect the pins on the meter to the nail heads (see photo). If you dry your own lumber, these nails can be left in place allowing you to monitor your wood as it dries.

Still can't make up your mind? Electrophysics (800-244-9908) offers a dual mode pin-type and pinless meter for $330. Good quality moisture meters are also available from Highland Hardware (800-241-6748), Woodcraft Supply (800-225-1153) and Woodworkers' Supply of New Mexico (800-645-9292); prices range from $50 to $250. For further reading on moisture meters call Forest Products Laboratories (608-231-9200) and ask for the report, "Electric Moisture Meters for Wood," by William James.

Resaw Without Warp

Q. I've had a few bad experiences with wood warping after I resaw. Is there any way to tell whether a board is a good candidate for resawing?

Tom Martin
Casper, WY



A. The warp you refer to is case-hardening. A case-hardened board looks like any other board but has internal stresses caused by improper drying techniques. These stresses lay hidden until resawing releases them causing the board to warp.

Unfortunately, there's no way to visually tell if a board is case-hardened or not, but there is a simple test. Go in about 6-in. from the end of the board and cut a 3/4-in.-thick section. Go to the bandsaw and cut out about one half of the width from the middle. If case-hardening is not present, the fork will remain stable. If there are internal stresses present, they will manifest themselves in forks that either pinch together (case-hardened) or bow outward (reverse case-hardened).

Harlan Peterson, University of Minnesota Department of Forestry, helped us with this answer. AW

Department of Corrections

The cutting list in the Hoosier Cabinet story (AW #77, p.63) contains double listings. Pieces R-1 through Z-5 are listed twice. The second (bottom) listing of these parts is the correct one to use.

The birdhouse Christmas tree ornament on page 71 of AW #78 was turned by John Magnussen of Buffalo, Minn. The birdhouse design has traveled far and wide in recent years, much inspired by the full-size versions by Andy Barnum of Carmel, NY. (see cover of AW #13).

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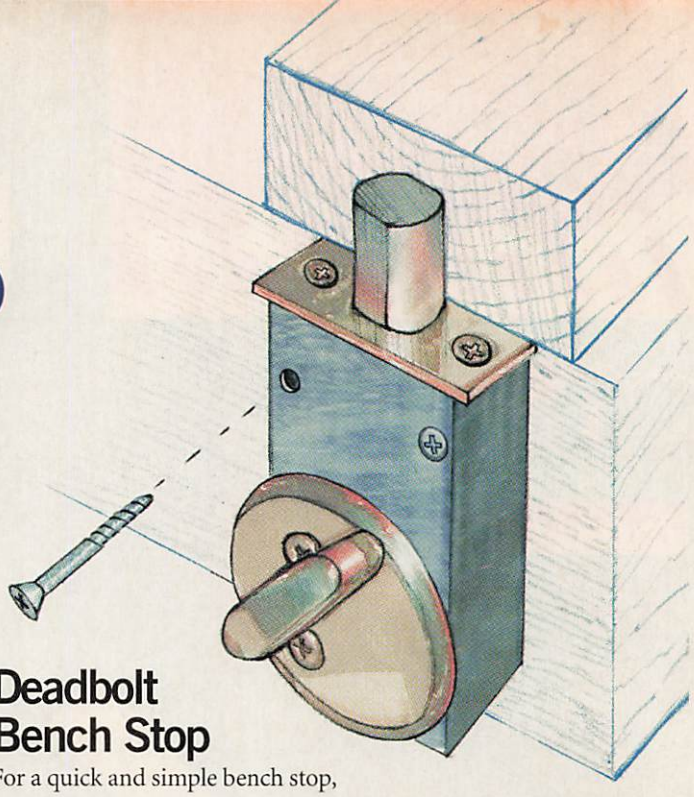
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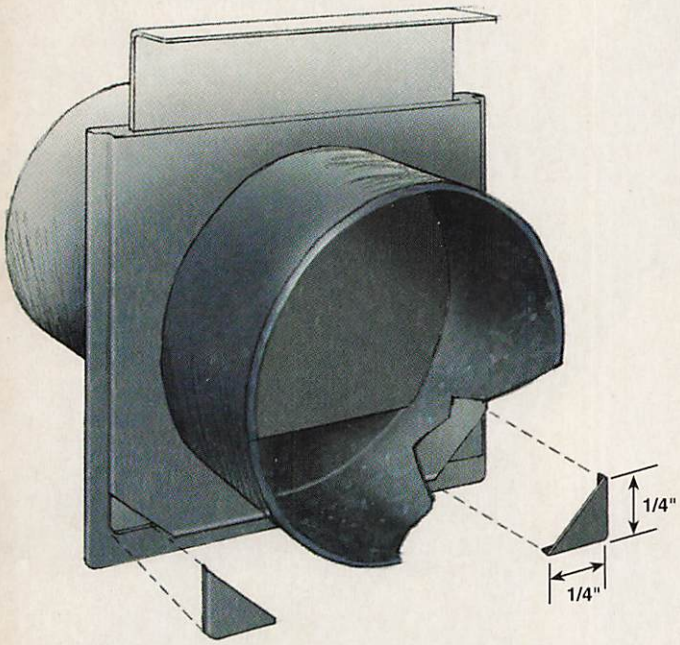
WorkShop Tips



Deadbolt Bench Stop

For a quick and simple bench stop, I mounted an old deadbolt taken from a door to the end of my workbench. In the "locked" position, the bolt stays put, and in the "unlocked" position it can be pushed down so you can use the unobstructed top.

DARRYL THOMAS
THORNHILL, TN



Those Blasted Gates

Periodically, fine dust and sawdust accumulates in my plastic dust collector blast gates, preventing the gates from fully closing. Because the gates are permanently molded into the housing, I can't take them apart to clean them. Removing a small triangle at each of the bottom corners of the housing allows the vacuum in the dust collector hose to flush out this debris. Even though there are now "holes" in the blast gates, I haven't noticed any appreciable loss in performance, though you could cover the openings with duct tape and periodically remove the tape to clear the sawdust.

CARL FREELAND
DODGEVILLE, WI



More Blade for Your Money

I use my scrollsaw blade almost exclusively for cutting stock of 1/2-in. thick or less. Consequently, I only use about one-sixth of the total cutting length of the blade. To maximize the life of the blade, I've built a raised platform that fits snugly on top of the scrollsaw table. When the blade gets dull, I install the platform and now I'm using sharp teeth. Finish the platform with varnish for a smooth sliding surface.

BETZALEL KIRSHNER
AZOR, ISRAEL

Knock. Knock.
Knock. Knock.
Knock. Knock.
Knock. Knock.

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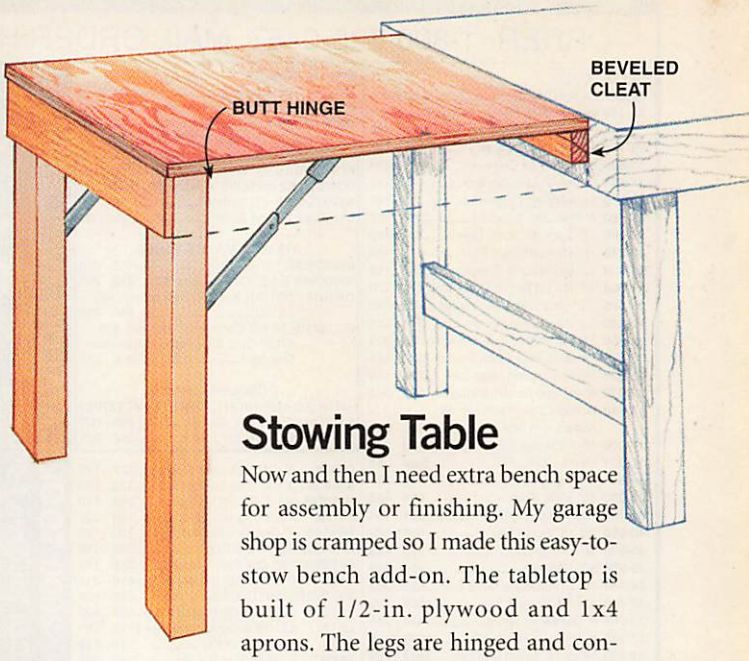
*Cargo room, towing, and power comparisons are vs. compact crew cab pickups and are based on data available at time of printing. **230 HP for California and northeastern states with special emission standards. Always use seat belts. Remember a backseat is the safest place for children. Properly secure all cargo.*



Drill Press Vertical Support

Drilling holes in the end of a long, narrow piece of wood, even with a floor-mounted drill press, can be a challenge. This fixture helps. Long boards are clamped to the fixture at the top and supported from below on a small adjustable shelf. The drill press table is swung to the side to put the end of the board under the drill bit. With this system, multiple holes in the ends are easy—just loosen the top clamp, slide the board over, and reclamp. These holes will automatically be in line, the same distance from the face of the board.

DICK FORD
SARNIA, ONTARIO



Stowing Table

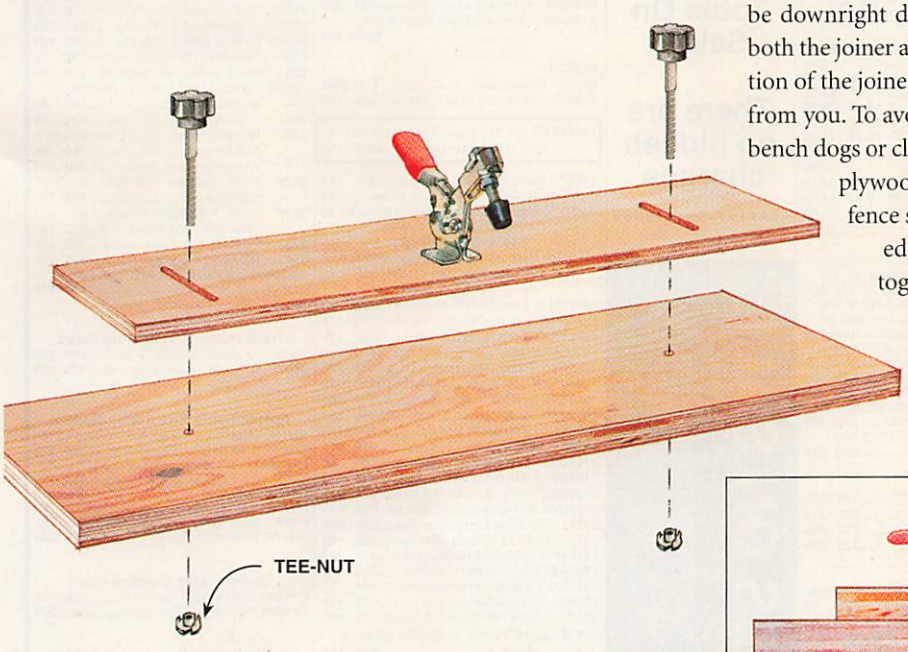
Now and then I need extra bench space for assembly or finishing. My garage shop is cramped so I made this easy-to-stow bench add-on. The tabletop is built of 1/2-in. plywood and 1x4 aprons. The legs are hinged and connected to the tabletop with a collapsing brace to prevent the legs from being accidentally kicked in. The add-on table connects to my workbench with a beveled cleat—a 2x4 cut at 45 degrees. Storage is a snap—it slides against the wall behind my bench.

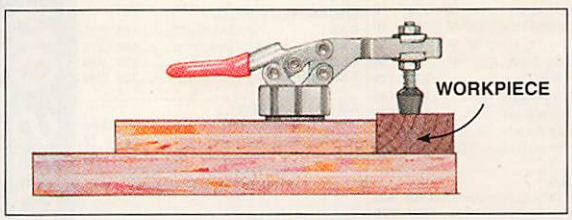
PHIL PRATT
MARCO ISLAND, FL

Biscuit Joiner Jig

Cutting slots for biscuits in small or narrow stock, such as when slotting solid-wood edge banding for shelves or cabinets, can be downright dangerous. There's no effective way to hold both the joiner and the stock with your hands. Also, the rotation of the joiner blade can fling a small piece of wood away from you. To avoid this, I devised this jig. Clamp it between bench dogs or clamp it to the benchtop with C-clamps so the plywood base just overhangs the bench. Adjust the fence so the stock you are cutting is flush with the edge of the jig. Clamp the stock down with the toggle clamp and you're ready to cut.

ANDY RAE
LENHARTSVILLE, PA





(continued on page 20)

EDITOR: WILLIS BOWMAN • ART DIRECTION: BARBARA PEDERSON • ILLUSTRATION: MELANIE POWELL

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31-695	6" Belt/9" Disc Sander	441	299
23-710	Sharpening Center	228	155
31-460	4" Belt/Disc Sander	168	119
40-560	16" 2 speed Scroll Saw	230	129
40-540	16" var/spd Scroll Saw	243	159
11-990	12" Bench Drill Press	237	184
11-090	32" Radial Bench Drill Press	417	279
43-505	1/2" Bench Router/Shaper	398	299
22-540	12" Bench Top Planer	518	259
22-560	12-1/2" Planer w/ extra knives	572	329
36-865	Versa Feeder Stock Feeder	337	249
36-220	10" Compound Mitre Saw	294	199
37-070	6" var/spd Bench Jointer	362	265
14-650	Hollow Chisel Mortiser with chisels and bits	380	249
17-900	16-1/2" Floor Drill Press	490	329
17-924	Mortise Chisel Kit	Sale	65
34-555	Sliding Table	518	339
36-250	10" Slide Compound Saw	696	455
31-780	Oscillating Spindle Sander	261	194
40-650	Q3 18" Scroll Saw	600	389
36-905	30" Unifence	363	259
36-906	50" Unifence	454	319
36-444	10" Contractors Table Saw	852	589
33-830	10" Radial Arm Saw	851	729
37-285	6" Jointer w/ stand	424	345
37-380	8" Professional Jointer	1500	1095
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50-851	2 HP, 1500 CFM	588	495

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28-275	14" Band Saw 3/4 HP	Sale	595
28-255	14" Platinum Edition Band Saw - 1 HP w/ mobile base, 18" rip fence, & 3/8" blade	Sale	849
31-280	Sanding Center w/ stand	1012	789
37-190	6" Deluxe Jointer	615	445
37-195	6" Professional Jointer	625	539

MILWAUKEE TOOLS

6527-6	Sawzall with case	343	169
6537-22	6527 w/quick lok blade change	362	179
6521-21	NEW variable speed orbital Super Sawzall	375	185
0224-1	3/8" Drill 4.5 amp magnum	240	138
0234-6	1/2" Drill 4.5A mag 0-850 rpm	255	134
0235-6	1/2" Drill w/keyless chuck	255	139
0244-1	1/2" Drill 4.5A mag 0-600 rpm	255	142
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	221	128
0228-6	3/8" Drill 3.5 amp 0-1000 rpm	214	124
0375-6	3/8" close quarter Drill	255	148
6176-20	14" Chop Saw	340	179
6546-6	Screwdriver 200 & 400 rpm	150	89
6547-6	6546-6 w/bits,1/4" chuck & cs	190	112
6390-21	7-1/4" Circular Saw w/ cs	267	139
5397-6	3.8" v/ spd Hammer Drill Kit	275	145
5371-6	1/2" v/ spd Hammer Drill Kit	360	194
6145	4-1/2" Grinder 10,000 rpm	182	105
6494-6	10" Compound Mitre Saw	595	329
6266-21	Top Handle Jig Saw w/ case	319	159

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Item	Description	Teeth	List	Sale
LU82M010	Cut-off 10"	60	93	32
LU84M011	Comb 10"	50	78	45
LU85R010	Super Cut-off 10"	80	114	69
LU85R012	Super Cut-off 12"	96	185	99
LM72M010	Ripping 10"	24	69	39
LU87R010	Thin Kerf 10"	24	72	49
LU88R010	Thin Kerf 10"	60	88	55
LU98R010	Ultimate 10"	80	128	79
LU91M008	Cmpnd Mtre 8-1/2"	48	89	40
LU91M010	Compnd Mitre 10"	60	88	54
F410	Quiet Blade 10"	40	95	54
SD308	8" Carbide Dado		230	119
SD506	6" Carbide Super Dado		279	154
SD508	8" Carbide Super Dado		344	175
FB100	16 piece Forstner Bit Set		338	194
94-100	5 pc. Router Bit Door System		320	169

HITACHI TOOLS

C8FB2	8-1/2" Slide Compound Saw	1169	449
C10FS	10" Slide Compound Saw	1627	579
C15FB	15" Mitre Saw	1346	659
C10FCD	10" dual bevel Compound Mitre Saw	550	265
NV45AB	Coil Roofing Nailer	935	379
NT50AE	Pinner 3/4" - 2"	Sale	129
EC12	2 HP, 4 gallon Compressor	561	289

MAKITA TOOLS

Model	Description	List	Sale
5090DW	3-3/8" Saw Kit 9.6 volt	213	139
DA391D	3/8 angle Drill 9.6V	142	95
DA391DW	3/8" angle Drill Kit 9.6V	216	139
6095DWE	9.6 volt Drill Kit w/2 batt	240	125
6095DWLE2	6095DWE w/flashlight	263	139
632007-4	9.6 volt Battery	55	30
632002-4	7.2 volt Battery	45	28

18 VOLT MAKITA TOOLS

6343DWAE	1/2" Drill Kit	458	255
5620DWA	6-1/2" Circular Saw Kit	458	255
DK1016	1/2" Drill & 6-1/2" Saw combo kit	698	389
DK1021BL	18 volt Combo Kit. Includes drill, 6-1/2" Circ. Saw, Recipro Saw, and flashlight	Sale	579

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9900B	3"x21" Belt Sander w/bag	322	165
9924DB	3"x24" Belt Sander w/bag	333	169
N1900B	3-1/4" Planer with case	268	142
1912B	4-3/8" Planer	360	205
N9514B	4" Disc Grinder 4.6 amp	106	65
DA3000R	3/8" Angle Drill	328	185
6013BR	1/2" Drill Rev. 6 amp	268	149
9401	4" x 24" Belt Sander w/bag	416	219
5007NBK	7-1/4" Circ Saw w/ case	238	125
LS1011	10" Slide Compound Saw	807	429
LS1211	12" Slide Compound Saw	1370	695
3901	Plate Joiner Kit	318	159
3612C	3 HP Plunge Router	503	265
LS1040	10" Compound Miter Saw	474	249
LS1013	10" Dual Compound Slide Miter Saw	1087	599
BO5010	5" Random Orbit Sander	121	69
LS1220	12" Compound Miter Saw	678	379
9227C	7/9" Polisher	338	195
2702	8-1/4" Table Saw	538	299
2703	10" Table Saw	568	309

SENCO AIR NAILERS

SFN30	NEW Finishing Nailer w/ cse	459	239
SNS45	Stapler 7/16" crown, 1" - 2"	540	365
SLP20	Pinner w/cs 5/8 -1-5/8"	422	189
SKS	Stapler 5/8 - 1-1/2"	390	259
SN70	Framing -Clip Hd 2 - 3-1/2"	725	449
SN65	Framing -Full Hd 2 - 3-1/2"	709	369
SN600	NEW Framing 2 - 3-1/2"	699	339
SFN40	Finish Nailer 1-1/4 - 2-1/2"	569	349

BOSTITCH AIR NAILERS

Model	Description	List	Sale
N80S-1	Stick Nailer	Sale	299
RN45	Coil Roof Nailer 3/4 - 1-3/4	845	339
N60FN-2K	Finishing Nailer w/ case	557	269
BT35-2K	Brad Tacker 5/8" - 1-3/8" with case, oil, & brads	279	119
MIIIFS	Flooring Stapler 15 gauge	902	539
S32SX-1K	Finish Stapler-1/2" - 1-3/8" with case & oil	269	135

JORGENSEN ADJUSTABLE HANDSCREWS

Item#	Jaw Length	Opening Capacity	List	Sale	Box of 6
#0	8"	4-1/2"	20.35	12.95	69.95
#1	10"	6"	23.30	14.50	79.95
#2	12"	8-1/2"	26.75	16.25	92.50
#3	14"	10"	33.85	20.25	114.95

PONY CLAMP FIXTURES

Model	Description	List	Sale	Lots of 12
50	3/4" Black Pipe	15.45	8.50	94.00
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EY6431FQKW	NEW 1/2" 15.6V drill kit with two 2 amp-hr Ni-Cad batteries, 30 minute charger, & case	342	189
EY6407NQKW	NEW 1/2" 12V drill kit with two 3 amp-hr Ni-Mh batteries, 45 minute charger, & case	339	189
EY6406FQKW	NEW 3/8" 12V drill kit with two 2 amp-hr Ni-Cad batteries, 30 minute charger, & case	305	169
EYC133	5-3/8" 15.6V Wood Cutting Saw and Drill Kit	650	379

BIESEMEYER FENCES

B-50	50" Commer. Saw	443	325
T-SQUARE 52	52" Homeshop	360	275
T-SQUARE 40	40" Homeshop	335	255
T-SQUARE 28	28" Homeshop	325	245

AIRY AIR NAILERS

Model	Description	List	Sale
0241SK	Brad Nailer 3/8" - 1-9/16"	180	79
0626SK	1/4" Crown Stapler 3/8" - 1"	194	89
	Above nailers come w/case, fasteners, oil & wrenches		

STABILA LEVELS

25010	10" die cast Torpedo Level	Sale21.95
24640	24" Level w/ hand holes	Sale47.95
24670	48" Level w/ hand holes	Sale 59
24632	"Jambor Level" designed for setting door jambs. Includes 78" level.	Sale 129

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DEWALT TOOLS

Model	Description	List	Sale
DW124K	1/2" right angle Drill	590	329
DW321K	Top Handle Jigsaw Kit	300	164
DW364	7-1/4" Circ. Saw w/brake	294	155
DW378G	7-1/4" Framer's Saw	210	159
DW610	1-1/2 HP 2 handle Router	266	149
DW411K	1/4 sheet Palm Sander w/ cs	88	58
DW682K	Biscuit Joiner with case	448	169
DW705	12" Compound Mitre Saw	734	339
DW621	2 HP Plunge Router	400	199
DW677K	3-1/4" Planer with case	268	155
DW431	3 x 21 v/spd Belt Sander	338	188
DW421	5" Palm Ran. Orb Sander	144	75
DW423	Palmgrip Random Orbit Sander - variable speed	170	92
DW272	Drywall Gun, 0-4000, 6.3 amp	160	95
DW276	Drywall Gun, 0-2500, 6.5 amp	160	99

DEWALT CORDLESS DRILLS

DW972K-2	3/8" variable speed w/ two 12V XR batteries	362	184
DW991K-2	3/8" variable speed w/ two 14.4V XR batteries	415	209
	Above drill kits come w/ charger & steel case !		
DW991KS-2	DW991K drill, DW935 trim saw, 2 XR batteries & case.	Sale	345
DW911	Jobsite Radio & Charger	Sale	139

DEWALT 18 VOLT CORDLESS TOOLS

DW933K	Jigsaw Kit	468	275
DW938K	Recipro Saw Kit	520	269
DW995K-2	1/2" Drill Kit w/ 2 batt	Sale	259
DW997K-2	1/2" Drill/Hammer Drill Kit	454	249
DW936K	5-3/8" Saw Kit	458	249
DW995KS-2	DW995K Drill, DW936 Saw and case	Sale	399
DW995KC-2	DW995K 18V drill kit, DW938 18V recipro saw, & case		399

NEW 24 VOLT DEWALT TOOLS

DW006K	1/2" Drill/Hammer Drill Kit	560	299
DW007K	6-1/2" Circular Saw	560	299
DW008K	Reciprocating Saw	560	299

DEWALT BENCH TOP TOOLS

DW708	12" Slide Mitre Saw	Sale	649
DW788	20" Scroll Saw	Sale	699
DW733	12" Planer w/ extra blades	Sale	399
DW744	10" Portable Table Saw	Sale	499

DAVID WHITE INSTRUMENTS

Model	Description	List	Sale
LP6-20A	Sight Level package-20x	329	245
LP6-20XLA	LP6-20A with 9056 tripod and 7620 rod	409	279
LT8-300	Level Transit - 26x	739	579
LT8-300P	above Level with optical plum	869	649
ALT6-900	Automatic Level - Transit - 18x	666	519
ALTP6-900	above Level with tripod & rod	799	559
ALP8-22	Automatic level - 22x with tripod and rod	Sale	359
AL8-26S	Automatic Level - 26x	854	325
ALP8-26	Above level with tripod & rod	Sale	389

BOSCH

Model	Description	List	Sale
1587VS	Top Handle "CLIC" Jig Saw	292	139
1587AVSC	1587VS Saw Kit with case and *New* Progressor blades	Sale	155
1584VS	Barrel "CLIC" Jig Saw	288	164
	Bosch Metal Case for above Jig Saws		24
	Bosch 30 blade assortment for Jig Saws		29.99

1584VS or 1587VS
with steel case and 30 Bosch blades
Sale 189

1295DH	5" Random Orb Palm Sndr	155	89
1274DVS	3"x21" v/spd Belt Sander	326	175
1278VSK	1-1/2"x12" Belt Sander	242	129
1275DVS	3"x24" v/s Belt Sndr	410	219
1276DVS	4"x24" v/s Belt Sndr	443	229
1194VSRK	1/2" v/ spd Drill w/ case	256	159
1613EVS	2HP v/s Plunge Router	374	199
1634VSK	Recip Saw 10.5 amp	356	185
3315K	12V T-handle Drill Kit	298	159
3615K	14.4V Drill Kit	340	174
3107DVS	5" Random Orbit Sander	181	98
3107DVSK	3107DVS with case	213	118
3725DVS	5" Random Orbit Sander	272	145
3727DVS	6" Random Orbit Sander	283	149
3915	10" Slide Compound Saw	960	499
3912	NEW 12" Cmpnd Mitre Saw	595	329
11224VSR	7/8" SDS Rotary Drill	434	229
1703AEVS	5" Grinder - 8.5 amp	264	145
1347AK	4-1/2" Grinder with case	159	92
1638K	Drywall Cut-out Unit	181	105
1617	1-3/4 HP Router - 2 handle	307	159
1617EVS	2 HP Router w/ variable speed - 2 handle	349	189
1618	1-3/4 HP Router - "D" handle	332	179
1618EVS	1618 router w/ var/speed	360	215
1640VS	Power Tenon Saw	200	129
1640VSK	Power Tenon Saw Kit	370	209
3850K	18V cordless Drill Kit	395	255

JDS AIRTECH AIR CLEANERS

Model	Description	List	Sale
750	12"x24"x28" 1/4 hp 200 CFM - 750 CFM	Sale	249
8-12	20"x24"x44" 1/3 hp 800 & 1200 CFM	Sale	479

JET TOOLS

JJ6CSXW	6" Jointer - closed stand and extra knives	Sale	499
JJ8CS	8" Jointer - closed stand	Sale	1189
JWBS14OS	14" Band Saw 3/4 HP - open stand	Sale	495
JWBS14CSK	14" Band Saw 1 HP - closed stand with rip fence and mitre gauge	Sale	579
JWTS10CWPF	10" Contractor Table Saw with 30" Exacta fence 1-1/2 HP & cast iron wings	Sale	789
JTAS10X501	10" Tilting Arbor 3 HP Table Saw with 50" Exacta fence, table, and legs	Sale	1399
JDP17MF	16-1/2" Drill Press 3/4 HP - 16 speed with bits and mortise attachment	Sale	429
DC-650	Dust Collector, 1 HP, 650 CFM	319	199
DC1100	1-1/2 HP, 1100 CFM Dust Collector	425	299

PORTER CABLE

9444VS	Var/spd Profile Sander Kit	218	119
690	1-1/2 HP Router 8 amp	284	149
6931	Plunge Router Base	142	89
693PK	690 and 6931 plus case	381	199
691	1-1/2 HP Router D-handle	312	168
691RS	"Ultimate Router Workshop" includes 691, 6931, & 698	Sale	325
693	1-1/2 HP Plunge Router Base	342	188
697	1-1/2 HP Router/Shaper	430	245
698	Heavy Duty Shaper Table	242	138
352VS	3x21 v/s Belt Sander w/bag	340	179
9352VS	Above sander with case	Sale	189
360	3"x24" Belt Sander w/ bag	410	225
360VS	360 Sander w/ variable speed	439	235
362	4"x24" Belt Sander w/ bag	424	229
362VS	362 Sander w/ variable speed	448	245
9125	3-1/4" Planer Kit w/ case	258	145
505	1/2 sheet Pad Sander	268	149
330	Speed Block Sander 1/4 sheet	129	69
556	Biscuit joiner w/ 5556 fence	250	135
557	Plate Jointer with tilt fence. Includes 2" & 4" blades for use with standard & face frame plates	400	205
5563	Face frame plates for 557		7.99
7529	2 HP variable speed Plunge Router	415	209
97529	Above router with guide, dust collection, and case	480	249
7519	3-1/4 HP Router 2 Handle	502	275
7518	3-1/4 HP 5 speed Router	550	295
7539	3-1/4 HP v/sp Plunge Router	570	294
7310	5.6 amp Laminate Trimmer	182	104
97310	Laminate Trimmer Kit comp.	318	194
97311	Laminate Trimmer Kit with underscribe base	390	209
7335	5" Random Orbit Sander	260	105
97355	7335 w/ case & dust pick-up	280	135
7336	6" Random Orbit Sander	265	109
97366	7336 w/ case & dust pick-up	290	139
332	Palm Grip Rndm Orb Sander	110	62
333	above sander with dust bag	120	68
333VS	Random Orbit Sander - variable speed	145	88
334	333 Sander with PSA pad	120	68
335	Palmgrip Random Orbit Sander with dual flip pad	150	88
310	Production Lam. Trimmer	260	154
347K	7-1/4" "Framers" Circ Saw with plastic case	232	129
743K	7-1/4" "Framers" Circ Saw with case - left hand version	232	129
9737	Tiger Recipro Saw	319	159
9543	Top Handle Jig Saw	300	165
CDA250	Angle Finish Nailer 1-1/4" to 2-1/2"	500	269

NEW Porter Cable Mitre Saws

3802	12" Compound Mitre Saw	580	349
3807	10" Slide Cmpnd Mitre Saw	975	519

Porter Cable Pneumatic Nailers

BN125	Brad Nailer -18 ga. 5/8"- 1-1/4"	160	89
BN200	Brad Nailer -18 ga. 3/4"-2"	230	128
FN250A	Finish Nailer -16 ga. 3/4"-2-1/2"	328	185
DA250A	Nailer -15 ga. 1-1/4"-2-1/2"	396	215
FC350	Framing Nailer - clipped head	502	285
FR350	Framing Nailer - round head.	502	285
RN175	Roofing Coil Nailer	505	259

Porter Cable Compressors

CF1400	1 HP, 4 gal. Pancake	356	199
CF2400	2 HP, 4 gal. Side Stack	586	329

Introducing New Porter Cable Cordless Products

9866	12 volt Drill Kit	Sale	145
9876	14.4 volt Drill Kit	Sale	169
9877	14.4 volt Hammer Drill Kit	Sale	199
9884	19.2 volt Drill Kit	Sale	269
9845	19.2 volt Circular saw Kit	Sale	275
9884CS	19.2V Drill / Saw combo Kit	Sale	385

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JWTS-10
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JWTS-10
Contractor's Style Tablesaw
with carbide tipped blade.
Now $499* after $50 mfr. rebate
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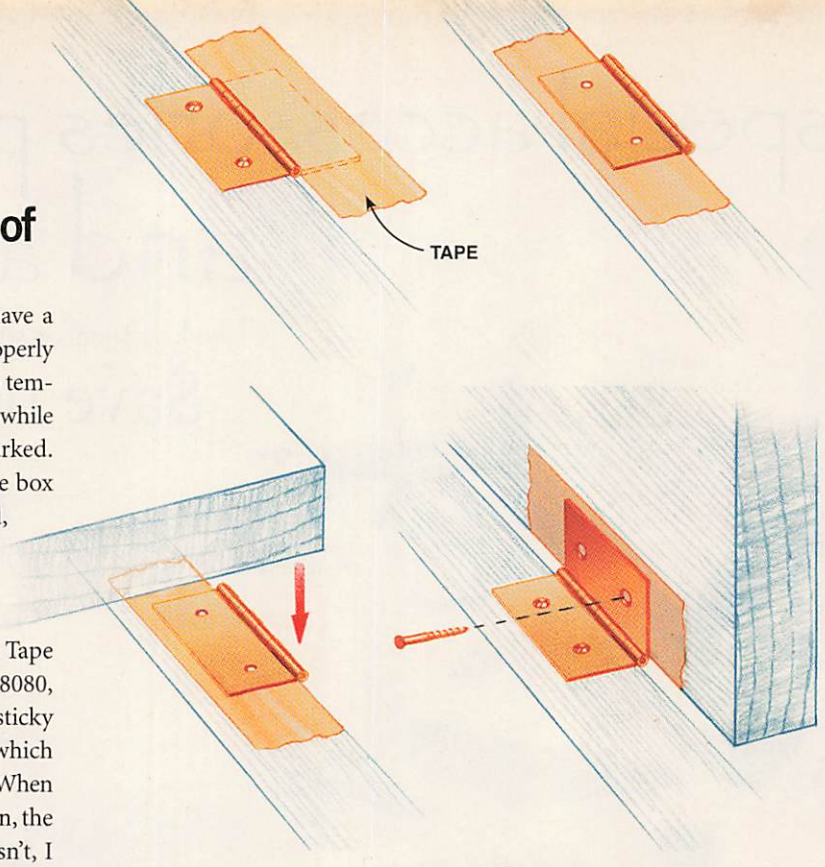
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Accurate Location of Small Hinges

On the jewelry boxes I make, I have a tough time getting small hinges properly aligned. I've come up with a way to temporarily attach the lid to the hinges while the screw holes are drilled or marked. The hinges are first attached to the box with screws. The hinges are opened, and on each of the open leaves, a large piece of clear shipping tape (3M, Scotch Premium Heavy-Duty Packaging Tape #3750, $4.69; Office Max, 800-788-8080, item #0700-3725) is fixed with the sticky side down. The hinges are closed, which places the sticky side of the tape up. When the lid is carefully placed in position, the tape should grab it. When it doesn't, I use a thin strip of wood to push the tape onto the lid. Gingerly open the lid on the hinges and press on the tape. The holes to the lid-side hinge leaves can now be drilled or marked. The shipping tape doesn't leave any residue and can be reused in case you are not satisfied with the first placement of the lid.



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Our new DynaBit™ delivers speed, long life and an EXTRA CLEAN EDGE.

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Introductory Price ONLY $ 15.35/EA. for 1/4" shank

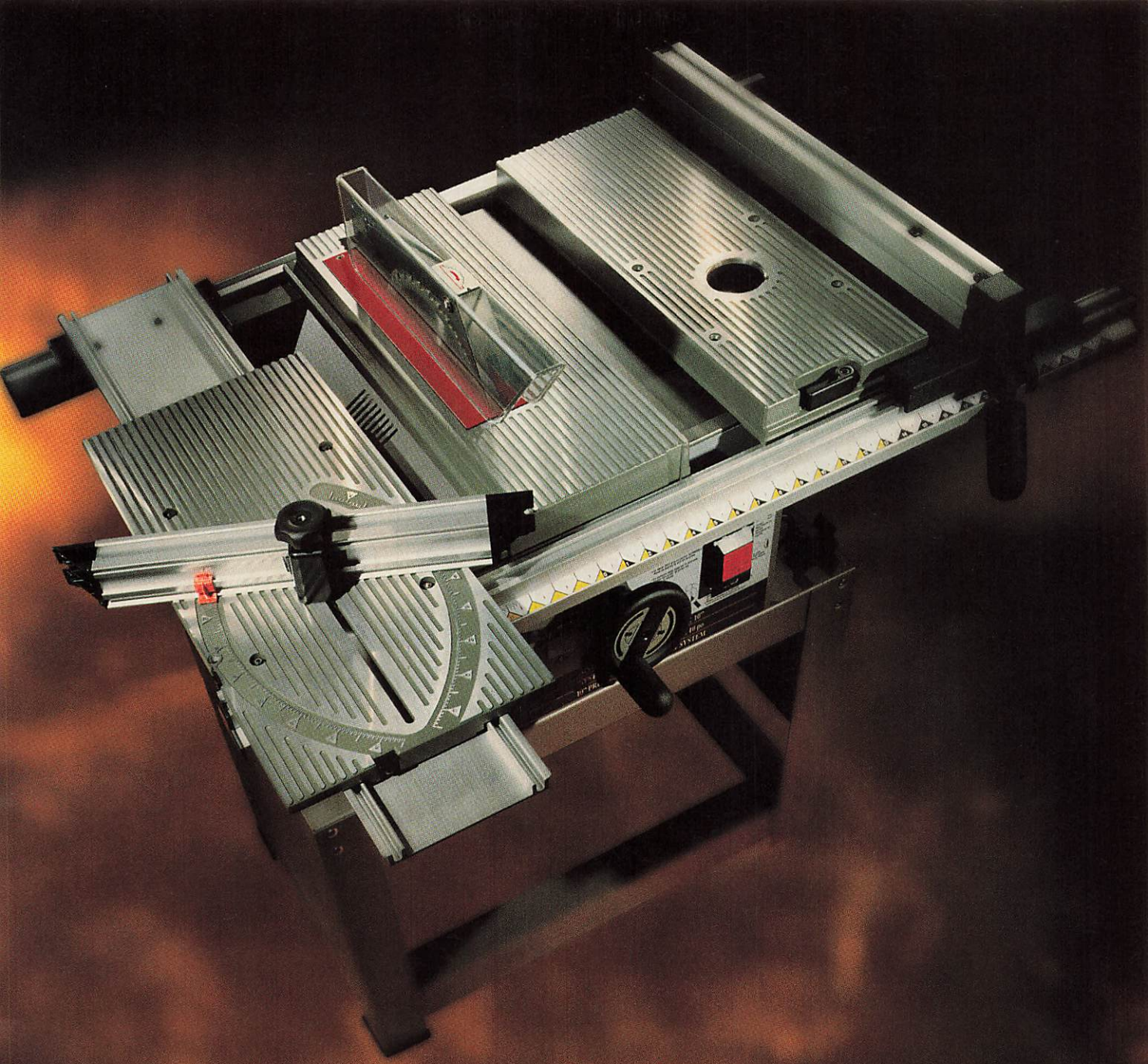
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■ 1" length of carbide, 1/2" diameter

Tool No. 47105 - 1/4" shank ...$15.35
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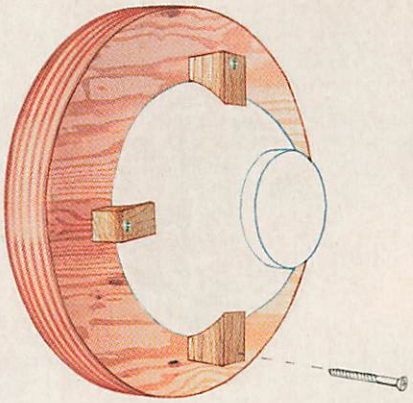
With its fine-tuned sliding miter table, triple-axis self-aligning rip fence, smooth-running dual belt-drive system, and precision-ground carbide blade, you can achieve all the accuracy you need for your most demanding projects. So any way you cut it, the Ryobi BT3000SX is precisely what you're looking for.

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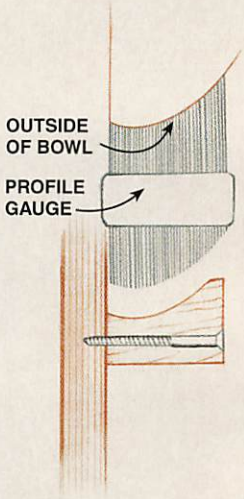
Turning Bowl Bottoms

I make a lot of turned "kitchenware" such as bowls and platters. I've perfected most of my techniques, but I struggle with turning a smooth foot. I've tried many off-the-shelf jigs, like chucks with adjustable jaws, but haven't been satisfied. The method I've come up with allows me to grab any bowl with a top larger than its foot (convex shape) so that the bottom can be easily turned and



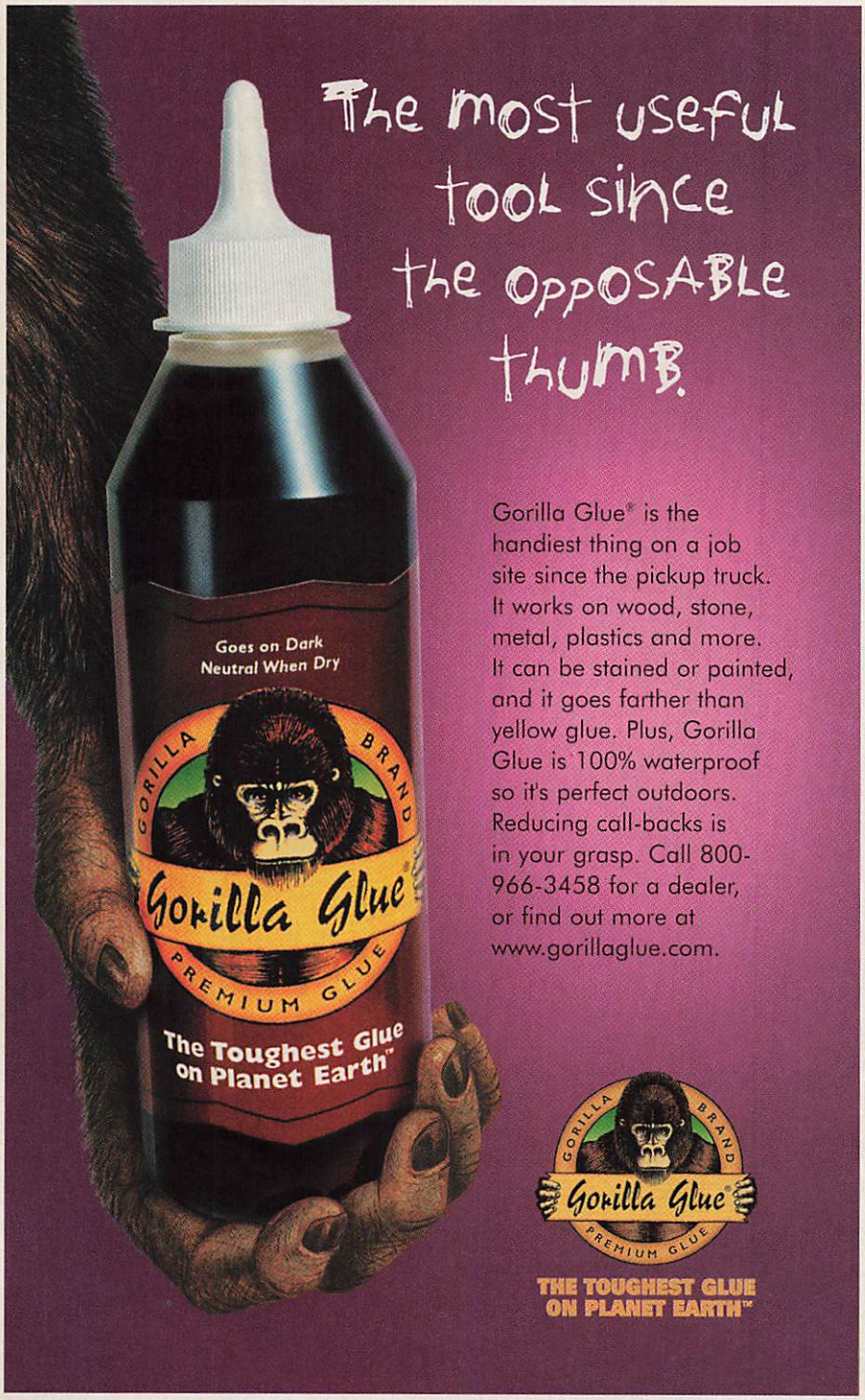
finished. I start by gluing my bowl blank on a sacrificial plywood disc which in turn is mounted to my lathe's faceplate. I turn the inside of the bowl and as much of the outside as possible. The bowl is carefully sawn off the plywood. I then mount a new 3/4-in. plywood disc on the faceplate and scribe onto it a circle the size of the bowl's top.

Now, here's the trick: using a profile gauge (a device made of many small, steel pins sandwiched between two plates; the ends of the pins are pressed against an object to copy its profile), I make four blocks with the same shape as the outside of the bowl. The bowl, centered on the circle, is clamped top side down on the plywood plate using the blocks, equally spaced around the bowl. I spin the bowl by hand to check for concentricity and then turn the bottom of the bowl at 500 rpm or less. **AW**



WILLIAM TARLETON
LAFAYETTE, CA

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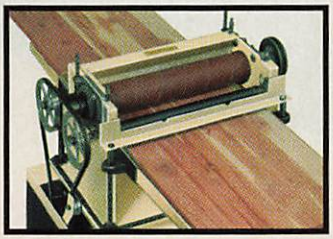
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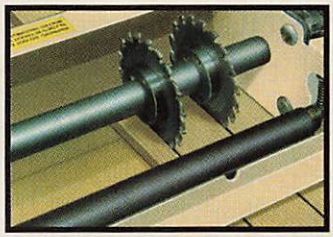
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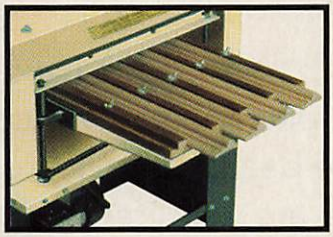
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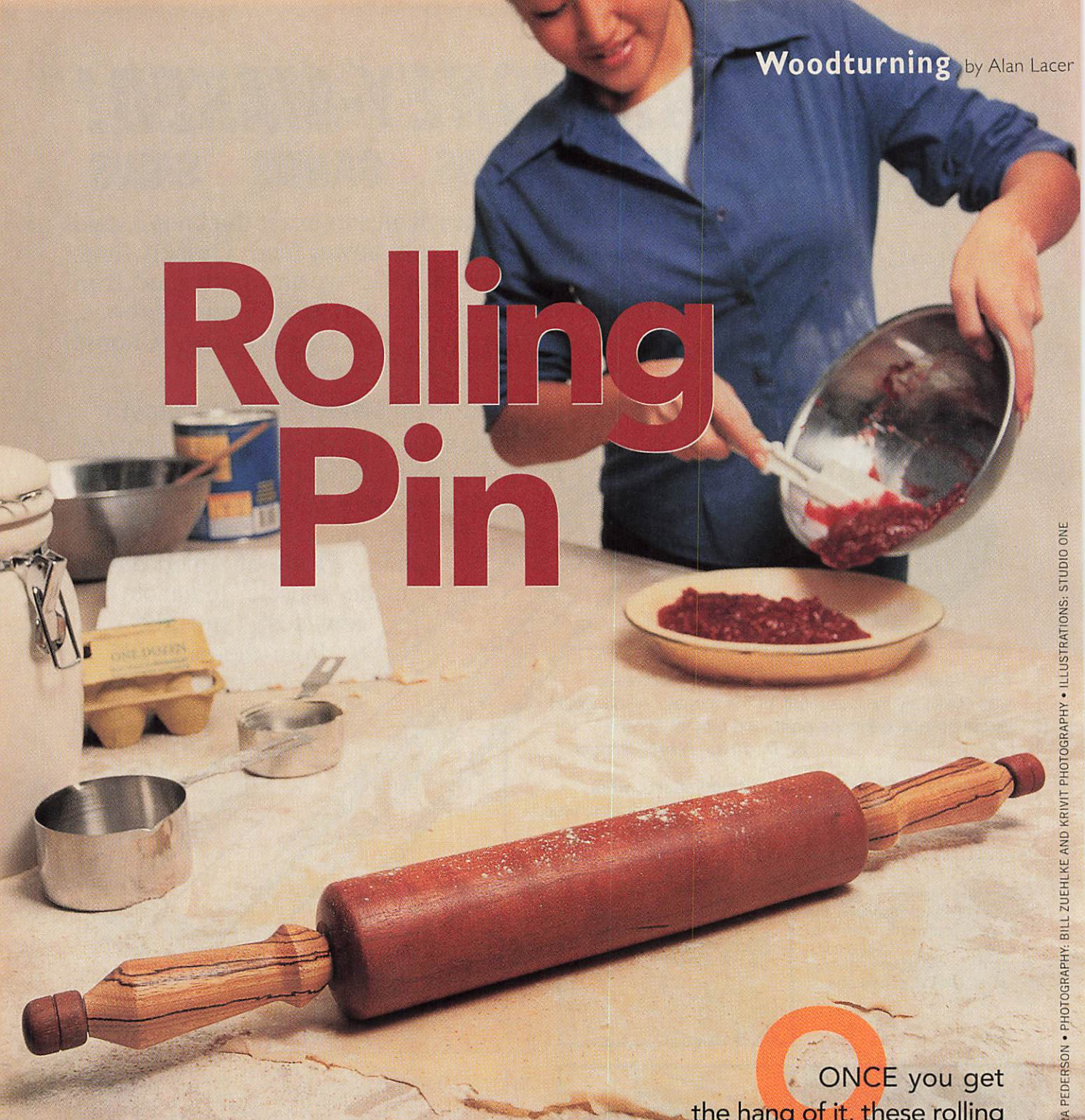
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Rolling Pin



ART DIRECTION: PATRICK HELF AND BARBARA PEDERSON • PHOTOGRAPHY: BILL ZUEHLKE AND KRIVIT PHOTOGRAPHY • ILLUSTRATIONS: STUDIO ONE

ONCE you get the hang of it, these rolling pins take only a couple of hours to make. The beauty of this project is that only a few tools are required and it offers several challenges, especially turning a true cylinder and drilling and aligning all the parts on the same axis. Follow our photo sequence and make a bunch of these rolling pins—they're great gifts.

Make your own Raised Panel Cabinet Doors

with your 1/4" or 1/2" Router, or your 1/2" or 3/4" Shaper.

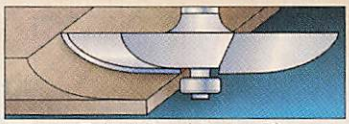




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It's simple, inexpensive, and easy with professional production quality MLCS carbide tipped door sets! Sets include Combinbation Rail and Stile bit, Raised Panel bit plus instructions, professional tips and techniques.



✶Raised Panel Router Bit



✶Combination Rail & Stile Bit

Raised Panel Door Sets ✶Ball bearing included

SET #	BIT STYLE	LRG. DIA.	SET PRICE
#1301	1/4" Shank Router	✶2"	$69.95
#1302	1/2" Shank Router	✶ 3-1/2"	$79.95
#1303	1/2" & 3/4" Shaper	4-5/8"	$99.95

Raised Panel Door Instructional Video
#1438 Special Sale Price $9.95

The NEW Merle Clamp now features pivoting jaws that adjust to any angle!

The new flexible jaw inserts are made of non-marring high impact ABS plastic and are easily removed. The NEW dual pivot feature allows the Merle to clamp virtually any size or shape securely! 23 ft. of steel banding included.

WOOD Product Scorecard
Merle Clamp-Editors Choice, Winter '97
Performance ★★★★★
Value ★★★★★

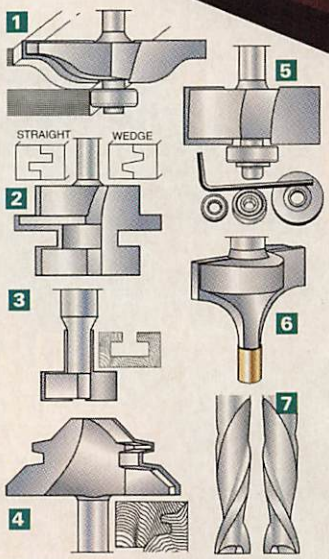
- Clamp circles, ovals, rectangles, and with additional corners (see below*) 5, 6, 7, 8 or more sides.
- Ideal for clamping drawers, doors, picture frames, boxes, cabinets, etc. Holds firmly in square.
- Adjustable, uniform clamping pressure on all sides
- Durable cast aluminum and steel construction
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Merle Clamp and 23 ft. of steel banding
#1439 REG. $39.95 .....SALE $26.95
*4 Additional Aluminum Corners and Jaw Inserts
#1440 Set of 4 .....SALE $14.95

1/4" Shank Carbide Tipped Router Bits

Professional Production Quality!



1 OGEE RAISED PANEL
#1423 2" Large Diameter $29.95

2 TONGUE AND GROOVE
#1333 Straight $29.00
#1335 Wedge.....$29.00

3 T-SLOT CUTTER
#1305 3/4" lrg. dia, 3/8" sm. dia. ..$17.00

4 LOCK MITRE BIT
#1433 2" Dia.,For 1/2"-3/4" Stock ..$37.50

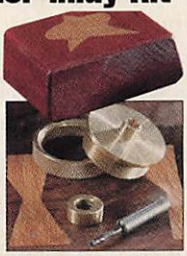
5 RABBETING KIT
4 depth of cuts: 3/8", 7/16", 5/16", 1/4". Set: 1/4" shank rabbeting bit, 4 bearings & hex key.
#1425 1-1/4" Large Diameter.....$25.00

6 BRASS PILOTED BIT SET
Rout into tight spaces and sharp corners. These bits have Brass Pilots, measuring only 5/32" in dia., instead of usual 1/2" bearing.
#1441 1/8", 1/4", 3/8" Round Over ..$44.95

7 SOLID CARBIDE UPCUT AND DOWNCUT SET
Upcut spiral ideal for mortise and tenon joints. Downcut will plunge cut and plane edges.
#1437 1/4" dia., 3/4" cutting length
Special Set Price $19.95

Solid Brass Router Inlay Kit

Follow template of almost any shape to make the recess. Fits Porter Cable, Black & Decker or any router with Porter Cable bushings adapter. Includes 1/8" solid carbide downcut spiral bit, brass bushing, brass template guide, brass retainer nut & instructions.



ITEM #1426 REG. $35.95.....SALE $21.95

16 pc. Forstner Bit Set

High Quality Steel for heavy use

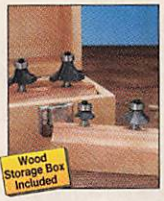
Sizes: 1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1", 1-1/8", 1-1/4", 1-3/8", 1-1/2", 1-5/8", 1-3/4", 1-7/8", 2", 2-1/8".



ITEM #1418
REG. $141.20.....SALE $43.95

Round Over-Beading Bit Set

1/4" shank, Carbide Tipped, 4 Round Over Bits with 1/2" OD bearing: (1/8", 1/4", 3/8", 1/2"), plus 3/8"OD bearing and allen wrench.



ITEM #1434
$72 Individually .....SALE $39.95

Biscuit Joining Set

5/32" Slot Cutter-1/4" Shank and 250 #20 Biscuits

Instruction sheet included.



ITEM #1385
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Wood to Turn

Use "closed-grain" wood—cherry, maple, birch or beech—for the roller so food particles aren't pushed into the wood pores. Don't use exotic hardwoods—zebra wood, cocobolo, and others—for the roller because they can be toxic.

For other turned parts, use whatever scrap hardwoods you have around the shop.



1 DRILL AXLE HOLES

Drill the blanks for handles, caps and one end of the barrel using a shop-made corner block. Drilling the holes before turning ensures that the holes will be centered.

Clamp the pieces firmly in the corner block to ensure the holes are vertical. Drill holes for the axle clamps and one end of the barrel with a 1/2-in. brad-point bit. **It's crucial that the hole in the large roller is centered and vertical.** Use a 14mm brad-point bit or a 9/16-in. spade bit to drill the 4-in.-long axle hole in the handles.

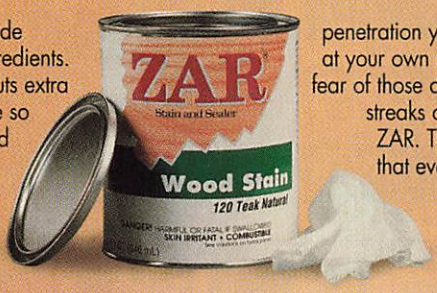
Tools and Supplies

Here's what you'll need:

- A 1/2-in. spindle gouge, a larger gouge for roughing out the main cylinder and a 1/4-in. parting tool.
- An outside calipers with at least a 3-in. capacity and well-rounded ends with absolutely no sharp edges.
- A 3-1/2-in. dia. disc of pine or poplar, 2- to 3-in. thick for the shop-made cone center.
- A 3-in. faceplate to mount and turn the cone center.
- A ball-bearing live center to hold blanks while turning. It should have a conical tip (see Sources, p. 34).
- A drill press for drilling holes in the blanks, plus a 1/2-in. brad-point bit and either a 14mm brad-point bit or a 9/16-in. spade bit.
- A 1-in. square piece of leather or thick fabric to protect the axle cap from the live center when turning.
- Mineral oil for the finish.

continued on page 28

ZAR® Wood Stain is made using only the finest ingredients. ZAR's unique formula puts extra pigment into a rich base so ZAR wipes on easily and covers evenly. And with ZAR's controlled penetration you can work at your own pace without fear of those disappointing streaks or lap marks. ZAR. The best thing that ever happened to wood.



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Only the DEWALT DW682K Heavy-Duty Plate Joiner makes it easy to construct a variety of accurate joints. The dual rack-and-pinion fence control guarantees precise vertical adjustments and precise fence alignments. And, for making cuts at any angle, the integral, adjustable fence tilts from 0° to 90°, then locks in place for unparalleled accuracy. Flush cuts can be made at 0° without removing the fence. Together, these features ensure accurate joints every time. The DEWALT Plate Joiner is also easy to use and control, thanks in part to the ergonomically designed barrel grip and the extra-wide paddle switch. Because it's so versatile, it can be positioned on the inside or the outside face of a mitered joint. For precision that can't be beat, choose DEWALT. It's built into every one of our plate joiners. Guaranteed Tough.™

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2

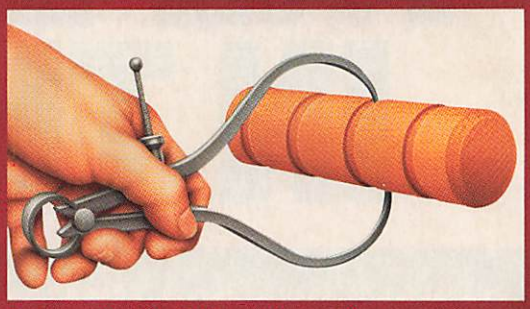
MAKE THE ROLLER

Mount an 11-in.-long blank between centers on the lathe. Place the end you previously drilled on to the live center of the tailstock. Your driving center should be located on the opposite end of the blank's center.

Turn the blank into a cylinder using a gouge.

continued on page 30

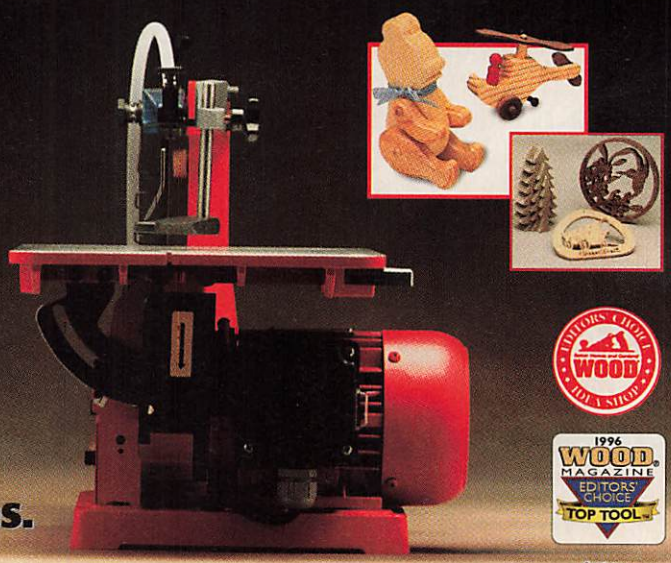
True Cylinders—with some help



With practice you can turn pretty true cylinders by eye and feel but until then, use calipers to help. Set your outside calipers to within 1/16 in. of the intended diameter of the cylinder. Using the calipers and a parting tool, turn down to the desired diameter at 4 or 5 points along the blank. Next, simply connect these with your roughing gouge to make a cylinder. To turn it by eye, sight along the top horizon—rather than watching the tool. Check your progress with a straightedge and calipers. Soften the corners of the roller using a small gouge. Remove the tool rest and proceed with sanding.

If you still need a little help in leveling the cylinder, try sanding with 80-grit paper over a back-up block at least 4-in. in length. After sanding with the lathe in motion, it often helps to remove "ringing" by sanding with the lathe off, but with the grain. This is especially helpful for the final sanding with 150-grit paper.

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Reduce Vibration
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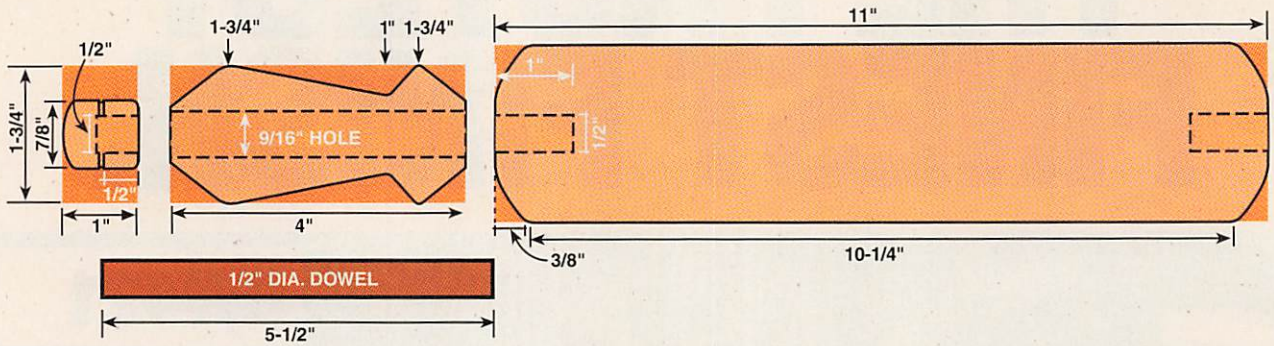
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The DEWALT Heavy-Duty Sanders were designed to produce the fastest, finest finishes possible on all kinds of materials. Take the DW421 Heavy-Duty 5" Random Orbit Sander, which features the patented DEWALT Controlled Finishing System to maintain pad speed and virtually eliminate gouging. Its 2.0-Amp motor provides maximum sanding speed while being extremely comfortable to use. And, features like the dust-sealed switch contribute to longer tool life. If greater control is needed, there's the DW423 Electronic Variable Speed sander (7,000 to 12,000 opm). The electronic variable speed keeps the sander running at a constant speed under load. For fine finishes, the DW411 palm grip sander has a 2.0-Amp motor with 13,500 opm. And for faster removal, the DW431 Belt Sander provides a compact and lightweight unit for sanding vertical surfaces or tight spaces. So choose the best sander for the job. Choose DEWALT. Guaranteed Tough.™

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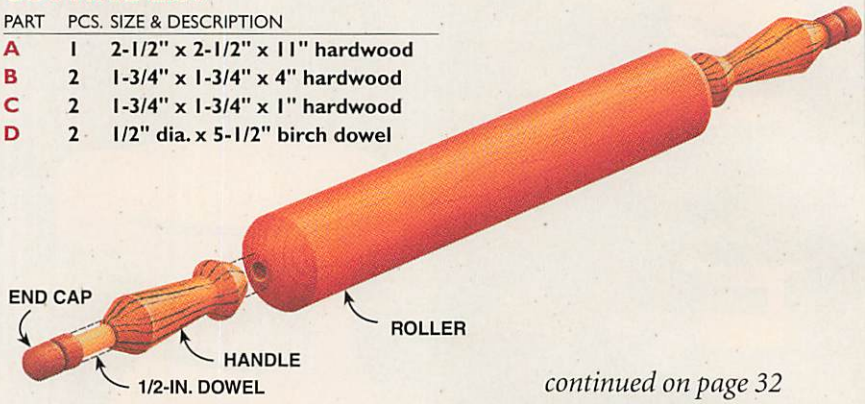


SHOPPING LIST

ITEM	QUANTITY
2-1/2" x 2-1/2" x 12" hardwood (maple, cherry, birch or beech)	1
1-1/2" x 1-1/2" x 10" hardwood	1
1-1/2" x 1-1/2" x 4" hardwood	1
1/2" x 36" hardwood dowel	1
3-1/2" dia. disc, 2" to 3" thick	1
3/4" standard wood screws	4
14mm brad-point bit or 9/16" spade bit	1
1/2" brad-point bit	1
sandpaper (80-, 100-, 120-, 150-grit)	3 sheets
mineral oil	6 oz.

CUTTING LIST

PART	PCS.	SIZE & DESCRIPTION
A	1	2-1/2" x 2-1/2" x 11" hardwood
B	2	1-3/4" x 1-3/4" x 4" hardwood
C	2	1-3/4" x 1-3/4" x 1" hardwood
D	2	1/2" dia. x 5-1/2" birch dowel



continued on page 32

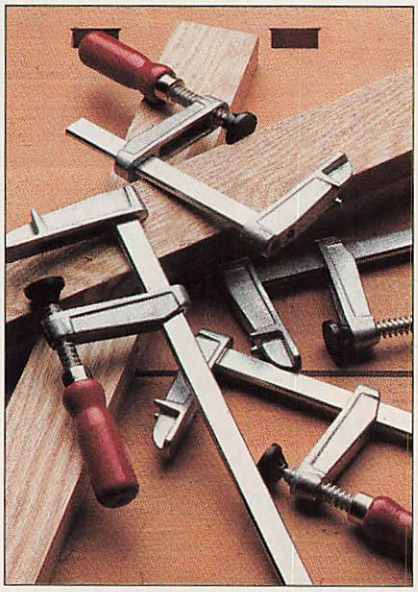
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Clamps From Garrett Wade

These are German made with the expected high quality design and workmanship – and at less than $4.50 each, they are a phenomenal value.

Light, strong and easy to use (throat depth 2½") with vinyl capped swivel ends and wooden handles. It's terrific to have a bunch around the shop. The Clamp size (listed below) is the maximum opening.

We cannot recommend these enough. Ten of each saves you considerably. Real value doesn't come any better than this.



		Regular	*Sale*
37F02.10	4" Cab. Clamp(10)	$62.95	$44.95
37F02.20	8" Cab. Clamp(10)	$68.95	$48.95
37F02.30	12" Cab. Clamp(10)	$73.95	$52.95

Combo. Set consists of 10 of each of the 3 sizes of clamps. 30 Clamps total- only $4.65 each.

37F20.10 Combo. Set $205.85 $139.50

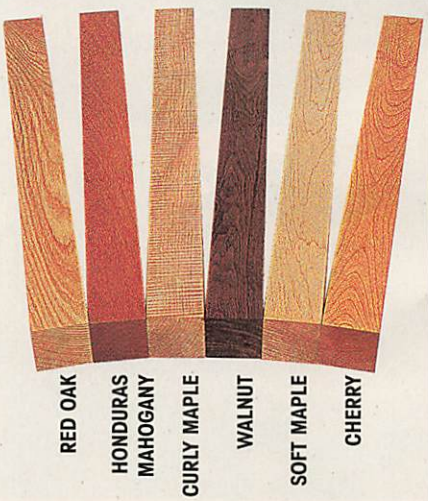
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DW621

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Fast and Accurate Depth Setting
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Converts from fixed base to plunge with the lock-down knob

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Rubber-coated knobs have built-in plunge lock and on/off switch

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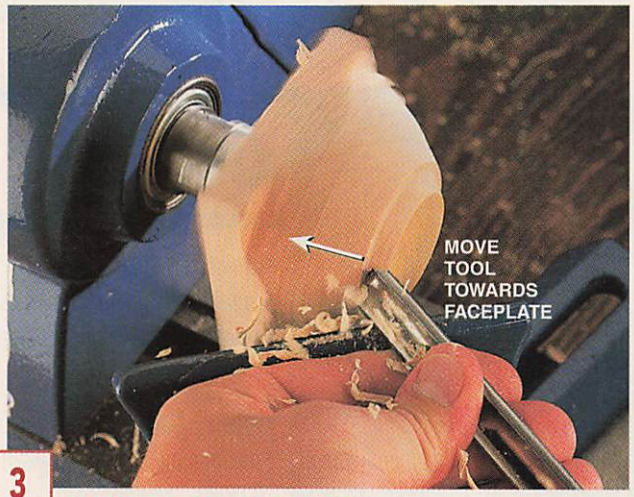
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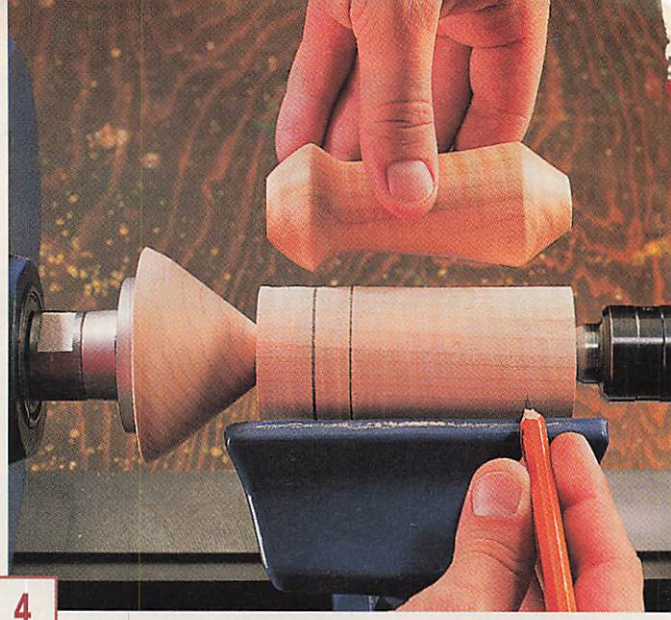
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3 MAKE A CONE CENTER

Turn a 2- to 3-in. thick, 3-1/2-in.-dia. disc of pine, poplar or other soft material into a cone to help hold the drilled handle parts. The exact angle of the cone isn't critical—between 60 and 80 degrees will work fine. To make the cone center, screw the disc onto a 3-in. faceplate using screws that penetrate the wood between 1/2 to 3/4 in.—try standard wood screws or better yet, #10 or #12 sheet metal screws. Turn the disc to a triangular point. Turn it like a bowl, moving the tool from the point of the cone towards the faceplate.



4 MAKE THE HANDLES

Turn one handle holding it between your cone center and a conical live center. If the handle stops spinning while you're turning, crank the live center into the wood and take lighter passes with the gouge.

Use the handle you just turned as a pattern and turn a duplicate. Hold a pencil on the tool rest, as shown, to transfer high and low spots of the shape to the spinning wood. You may want to use your outside calipers to do a more exact sizing of the second handle to the first. Carefully sand both handles.

continued on page 34

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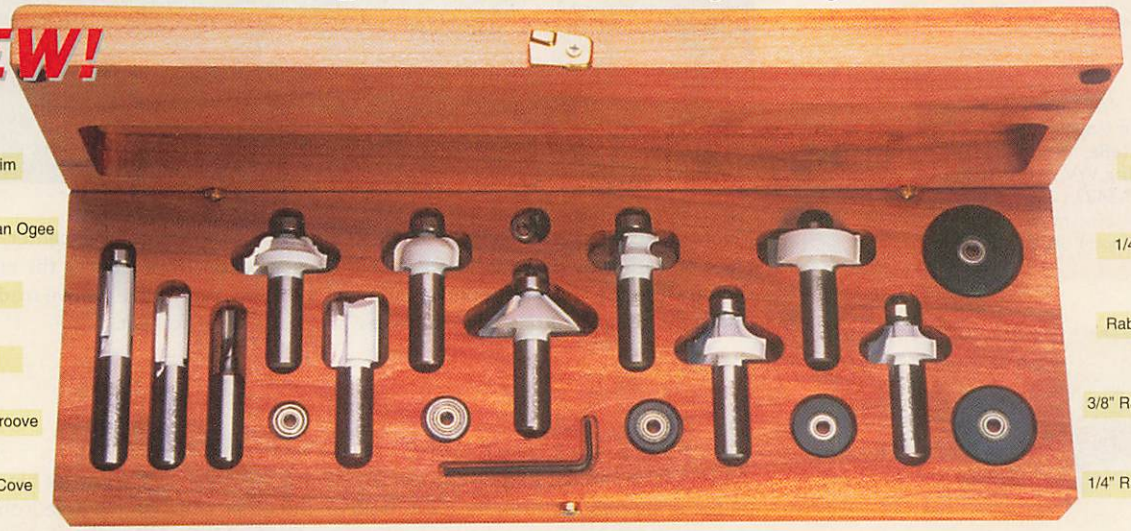
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1/2" brad-point bit, 12B18, $6





5 MAKE THE AXLE CAP

Mount the cap blank in the lathe between the wood cone and the live center. A piece of leather or thick fabric will keep the metal center from scarring the end of the cap. Turn the cap with rounded ends and a shallow, decorative groove made by rolling the gouge's cutting edge to make a slicing, semi-vertical cut.

6 FINAL ASSEMBLY

When you're finished turning and sanding, return the roller to the corner block jig on the drill press and drill the 1/2-in. hole on the other end. Use the hole from your drive center to pilot the point of the brad-point bit. Glue the dowels into the roller, slide the handles over the dowels and glue the axle caps on the ends. Finish the whole thing with mineral oil and wax. AW

Rely on Yellow to make the cut.

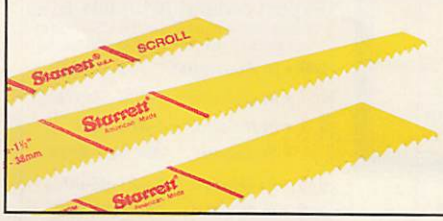


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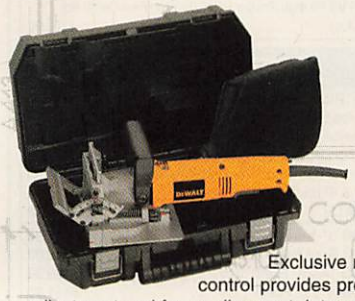
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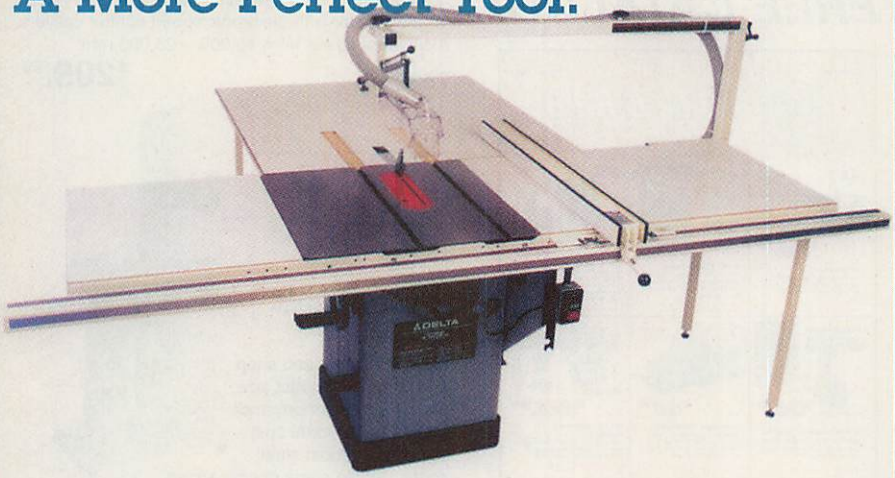
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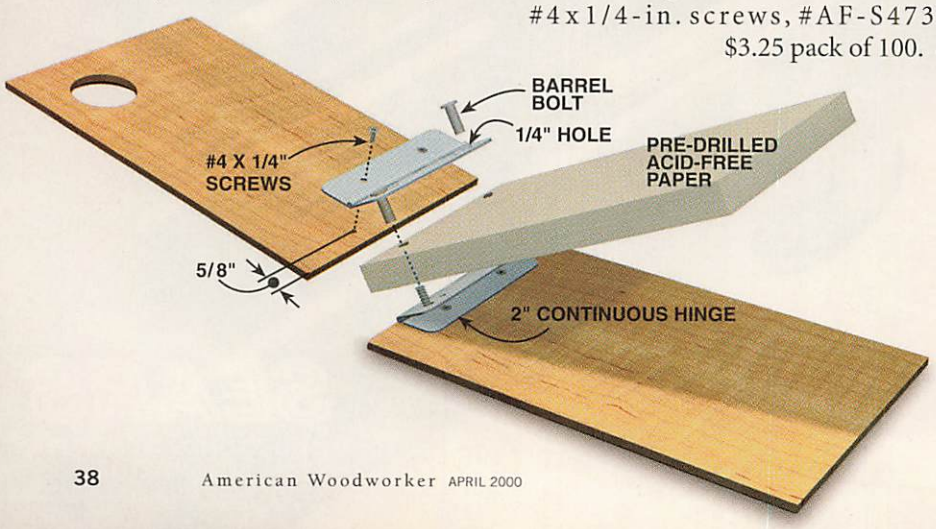


Photo Album

Do you have a pile of photos waiting to be put in an album? We all do. That's why you can't go wrong making these distinctive photo albums for yourself or as gifts.

Figured wood makes an attractive cover. The first album in the photo was made from a 3 in. x 20 in. piece of tiger maple and the second from a single 6 in. x 10 in. piece of walnut. You can make larger covers (12-1/2 in. x 12-1/2 in.), but they are more likely to warp. The walnut was resawn to make front and back covers. The maple was resawn and glued up to create book-matched covers.

The 9-1/4 in. x 5 in. acid-free paper pages come pre-drilled and are available from Anchor Paper, (800) 659-2127, #ZR301-213, $6.50 plus s&h for 25 pages. The 2 in. x 24 in. continuous hinge and the brass barrel bolt connectors and screws are available from Van Dyke's Restorers, (800) 558-1234; barrel bolts, #AF-S1572, $13.95; hinges, # AF-S6167, $.75 ea.; #4x1/4-in. screws, #AF-S4739F, $3.25 pack of 100. *AW*



How To Make It

1. Surface the covers to about 1/4 in. and chamfer the outside edges. (Optional: Use a 1-1/2-in. hole saw to cut a circular frame in the cover.)

2. Sand and finish. We used a sealer coat of Super Blonde Shellac followed by two coats of water-borne polyurethane.

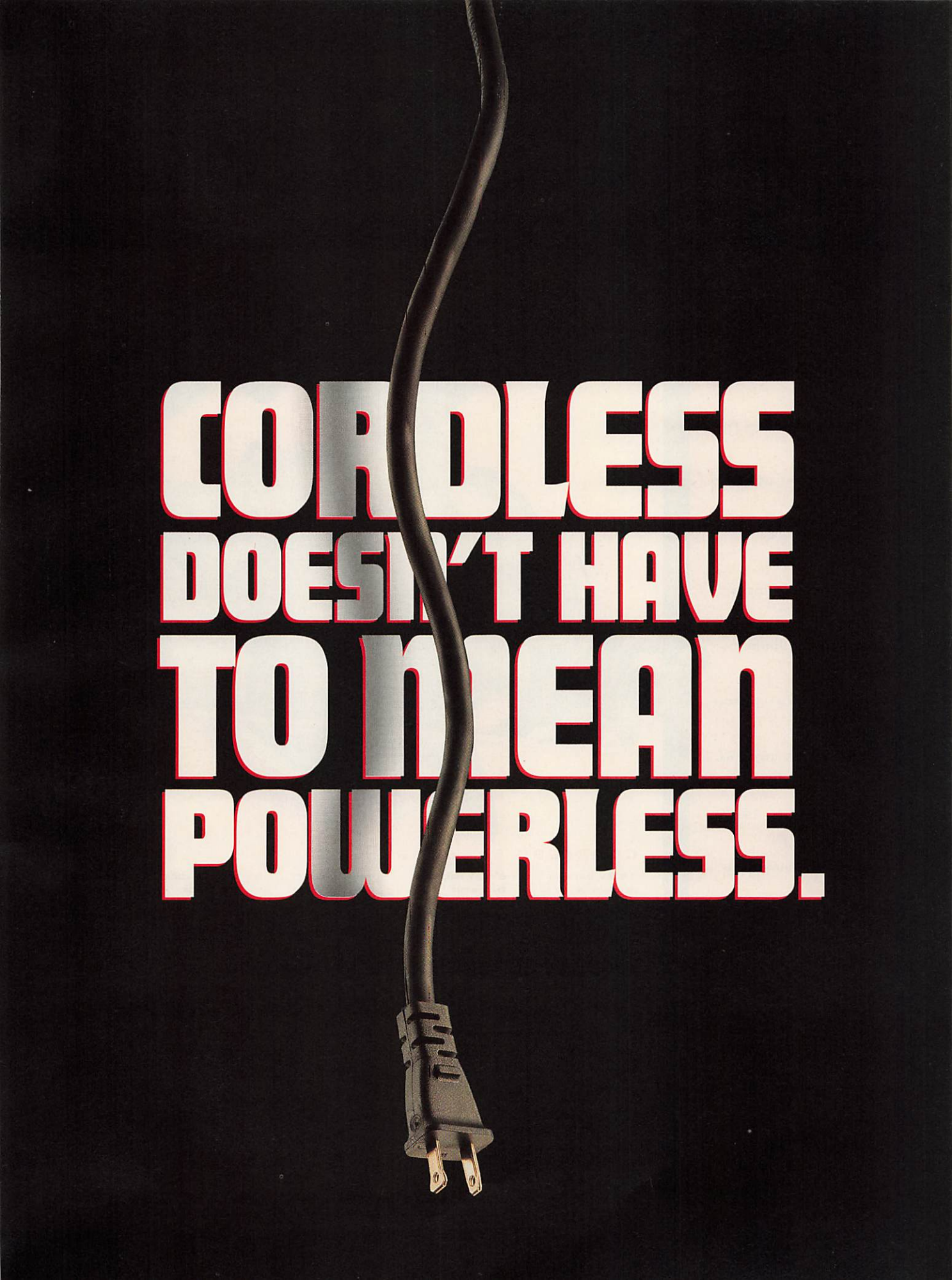
3. Cut two 4-in. lengths of hinge (two 11-in. lengths for 12-1/2 in. x 12-1/2 in. covers) for each album and file a radius on the corners.

4. Use the pre-drilled paper as a template to drill two 1/4-in. holes in one leaf of each hinge. File any rough edges smooth.

5. Drill two 5/64-in. pilot holes 5/8-in. in from the back edge of each cover. Mount the hinges to the cover with #4 screws. (Nip off the ends of the screws if your covers are 1/4-in. thick or less.)

6. Bolt the loose leaves of the hinges through the paper with the barrel bolts; add photos and enjoy.

ART DIRECTION: JOEL SPIES • PHOTOGRAPHY: MIKE HABERMANN • ILLUSTRATION: DAN WESTERBERG


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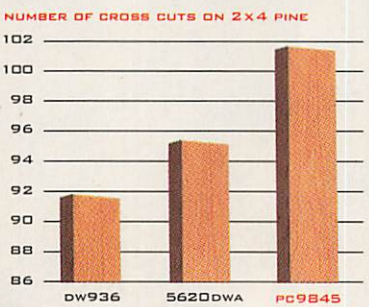
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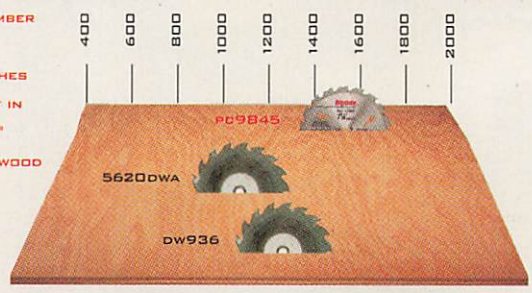
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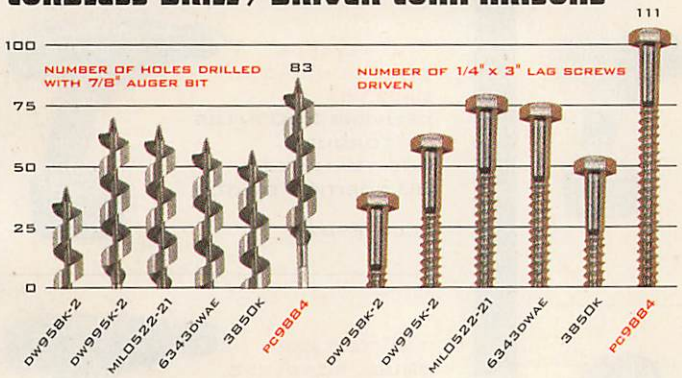
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Brad Nailers

By Tim Johnson



What was the first tool you ever bought? I'll bet it was a hammer. After all, hammering is something we begin to master as infants. No other tool feels as natural to hold or conveys its purpose quite like a hammer does. But guess what? As a tool for driving nails to fasten things, there's something better.

These tools are so versatile, affordable and easy to use that once you pick one up, you won't want to put it down.

BRAD NAILERS

Whenever you pull the trigger on a brad nailer you save time. It drives and countersinks brads instantly, without pre-drilling.

Air-powered nailers have been fixtures on job sites and in professional shops for years and there's an air-powered nailer for practically every nailing situation. But they're still uncommon in home woodworking shops. Yes, they do require a compressor and consequently seem expensive—especially compared to the cost of a hammer. But there are compelling reasons for a woodworker to own one: They're useful tools, much faster than hammering, more convenient to use and they give a cleaner result. Wouldn't you be willing to pay for all that?

Breakthrough Brad Nailers

The big news is that the latest generation of brad nailers can sink brads from 5/8-in. to 2-in. long, a range that used to require two separate nailers. That means the same brad nailer can be used for woodworking projects and also for light carpentry work around the house. What's more, these lightweight, compact-sized nailers are loaded with features for safety and convenience. To top it off, they're affordable; ranging from $90 to $145. You can buy one of these nailers *and* a compressor to power it for less than $300.

How a Nailer Works

A piston, housed in a cylinder inside the body of the brad nailer, is driven through its drive and return cycles by pressurized air (Fig. A). A rod attached to the bottom of the piston drives the brad. The brads are held in position under the drive rod by a spring-loaded magazine.

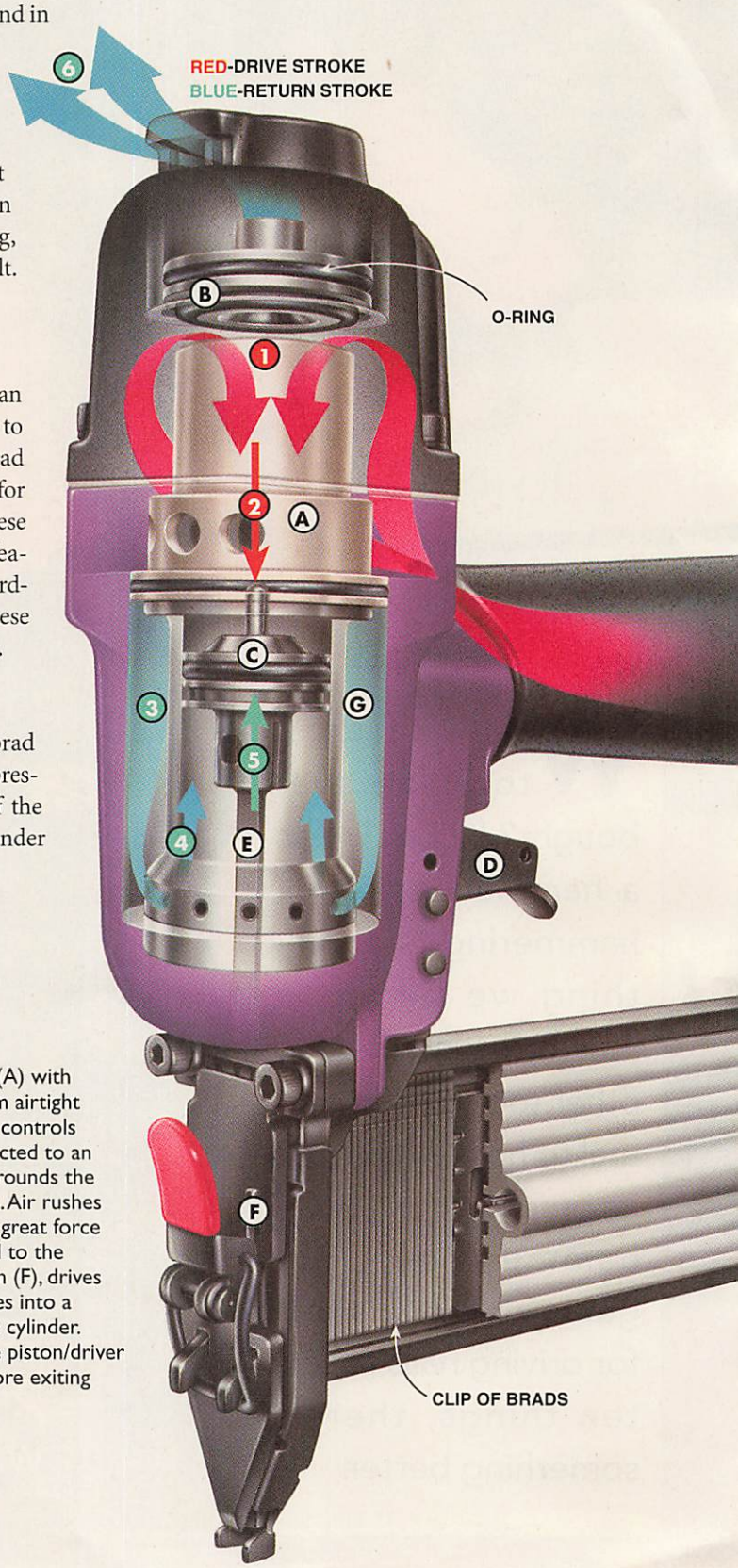


FIG. A AN AIR-POWERED HAMMER

A BRAD NAILER is a simple tool, containing a cylinder (A) with a head valve (B) and piston (C), and rubber O-rings to form airtight seals between the parts. A second valve at the trigger (D) controls the supply of air and operates the head valve. When connected to an air source, pressurized air fills the body of the gun and surrounds the top of the cylinder. Pulling the trigger opens the head valve. Air rushes into the cylinder (1) and drives the piston downward with great force (2). This is the drive stroke. A metal drive rod (E), attached to the bottom of the piston and housed in a guide shaft of its own (F), drives the brad. After driving the piston, the air immediately cycles into a return chamber (3, G) that surrounds the lower half of the cylinder. From there the air rushes back into the cylinder under the piston/driver assembly (4), and drives the piston back to the top (5) before exiting through the exhaust port (6). This is the return stroke.

ART DIRECTION: PATRICK HELF • PHOTOGRAPHY: BILL ZUEHLKE AND RAMON MORENO • ILLUSTRATION: STUDIO ONE

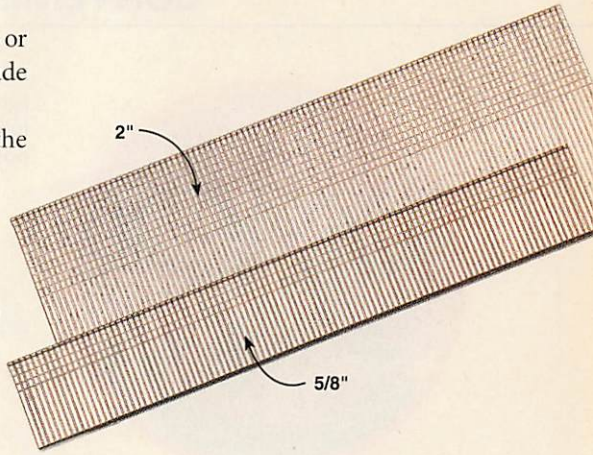
Specially Designed Brads

A brad nailer drives brads (Fig. B) that are a hybrid of staples and traditional finish nails. They're rectangular, with tee-shaped heads and slightly blunted vee-shaped tips, and coated with glue to increase their grip strength. They're also conveniently packaged. Load a clip into the magazine and you're ready to drive 100 brads.

A Small Compressor

Brad nailers don't have big appetites for air. A 1-hp compressor with a small (minimum 2-1/2 gallon) reserve tank, capable of supplying about 2.0 cubic feet of air per minute (cfm) and maintaining up to 120 pounds per square inch (psi) of air pressure provides plenty of punch. Pressure adjustments, depending on the length of the brads or the hardness of the material, are made at the regulator on the compressor.

You'll need a hose to connect the nailer and compressor. A good one will remain flexible under pressure. They're usually made with three layers, an outer protective cover surrounding a wrap of braided, high tensile material that's bonded to an inner core of natural rubber or PVC tube. Use 3/8-in. inside diameter (i.d.) hose for runs longer than 50 feet, otherwise 1/4-in. i.d. works fine. Expect to pay $15 to $20 for a 25-ft. length. Quick-connect fittings on both ends of the hose (another $10) are convenient. Most nailers come with one fitting.



A WIDE RANGE of brads can now be driven by the same nailer. New models can handle brads from 5/8 in. to 2-in. long. Driving long brads requires more air pressure than short ones. To accommodate the varying demands, the nailers are designed to operate between 70 and 120 psi.

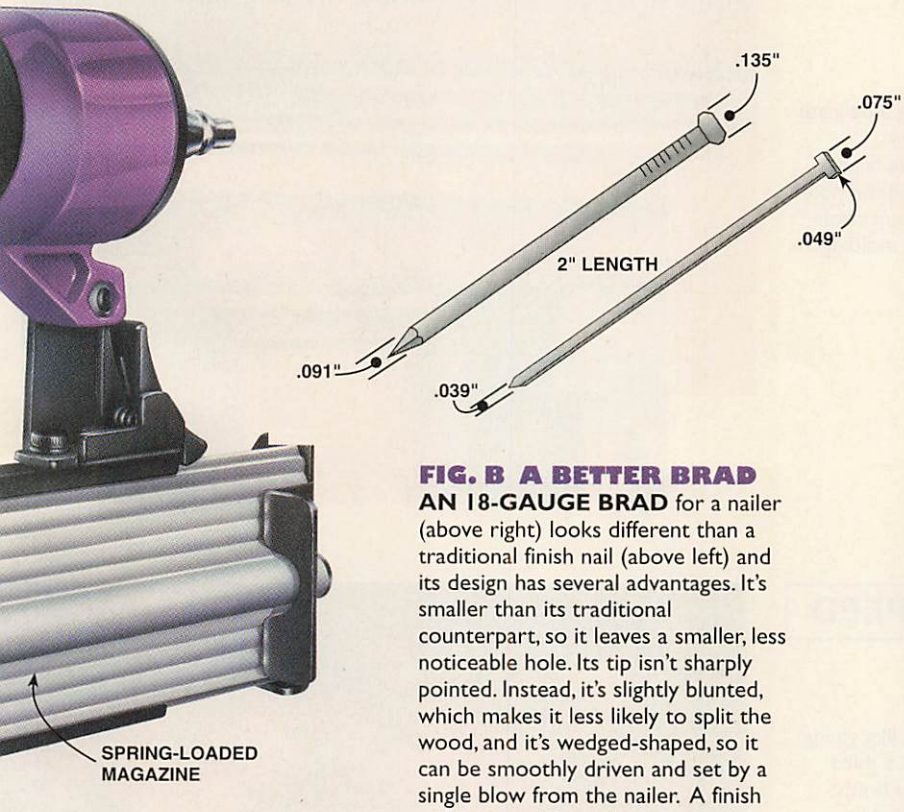


FIG. B A BETTER BRAD

AN 18-GAUGE BRAD for a nailer (above right) looks different than a traditional finish nail (above left) and its design has several advantages. It's smaller than its traditional counterpart, so it leaves a smaller, less noticeable hole. Its tip isn't sharply pointed. Instead, it's slightly blunted, which makes it less likely to split the wood, and it's wedged-shaped, so it can be smoothly driven and set by a single blow from the nailer. A finish nail has to withstand numerous hammer blows, so it must be made of harder steel, is noticeably larger in diameter and has a bigger head.

TIP

How to Avoid Impact Marks

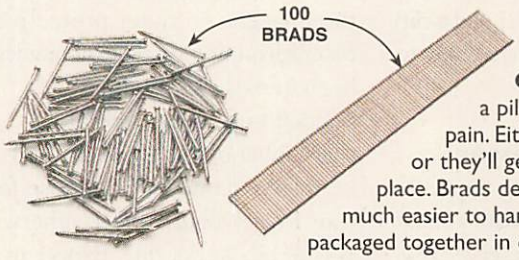
Brad nailers sometimes leave dents on the surface. These dents aren't made on the drive stroke. They're caused by the gun's recoil on the return stroke. The manufacturers' simple solution is to supply a plastic tip that fits over the drive point and protects the wood surface. It works, but obscures the drive point from view. A sure-fire way to avoid dents is to buy a nailer that has a trigger-controlled return. This mechanism, designed for safety, allows you to control the return stroke—it won't occur until you release the trigger. To avoid marring the wood, simply remove the nailer from the surface before you release the trigger.

Good Reasons to Own a Brad Nailer

CONVENIENCE



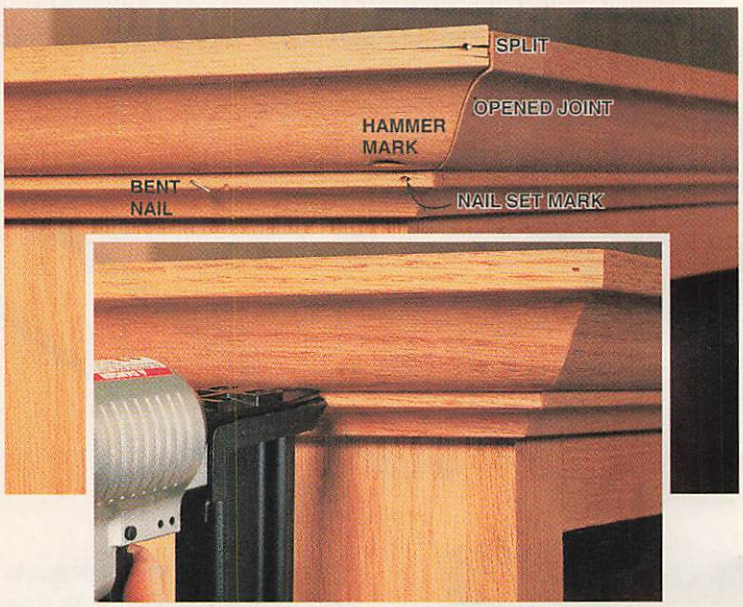
A brad nailer combines three tools, a hammer, drill and countersink, in a lightweight package that you can hold in one hand. And you can forget fumbling for brads or mashing your thumb—the nailer holds them in position for you.



OUCH! Dealing with a pile of 100 brads is a pain. Either you'll get poked, or they'll get dropped all over the place. Brads designed for a nailer are much easier to handle because they're packaged together in clips.

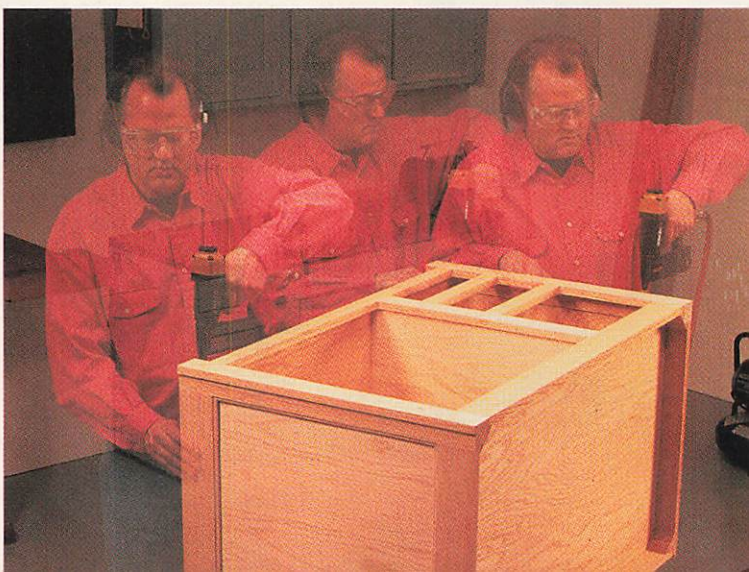
BETTER RESULTS

A BRAD NAILER EXCELS at jobs requiring a delicate touch. Instead of numerous jarring hammer blows, each brad is driven in one shot. A nailer can sink brads close to the edge of a piece without splitting and the holes left by the brads are tiny. Brad nailers are excellent tools for attaching trim moldings to cabinets or edge moldings to shelves.



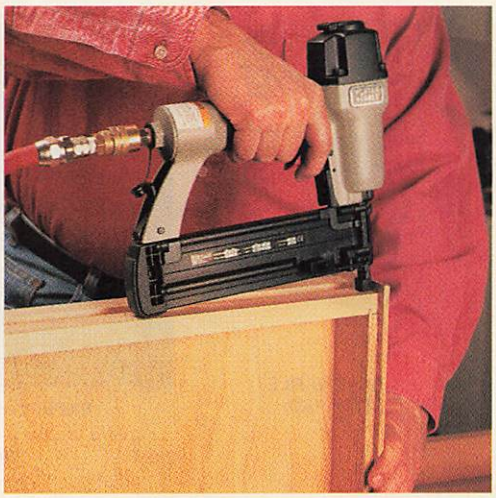
SPEED

STREAMLINE BUILDING PROCESSES, like gluing a face frame onto a cabinet, by using a nailer as a third hand. Taking a few seconds to shoot a couple of brads keeps the face frame from slipping out of place while you're putting on the clamps. Brad nailers are great for making jigs or fastening improvised clamps or stop blocks.

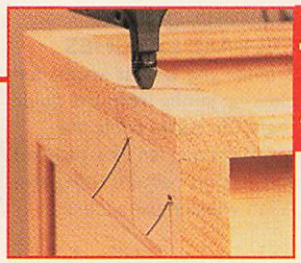




AROUND THE HOUSE, 2-in. brads are long enough for light carpentry jobs, like fastening thin trim moldings to studs through 1/2-in. drywall. However, you may need to rent or buy a bigger nailer for some trim jobs. Nailers are much less tiring than hand hammering in overhead work; installing a beaded ceiling, for example.



IN THE WORKSHOP, 5/8-in. to 1-1/2-in. brads are perfect for numerous applications, from assembling built-up moldings to making prototypes. Simple drawer joints, glued and reinforced with brads are amazingly strong.



BLOW-OUT

The Bane of Brad Nailing

BLOWOUT is unpredictable, instantaneous and dangerous. **Keep your free hand away from the path of the brad.**

Because they're made from soft steel, brads have a tendency to deflect when they encounter something hard. A hidden knot, a bit of metal or even the cellular structure of a hard wood can cause the brad to come shooting out the side of your work. The result can be catastrophic (photo, middle left).

You can minimize the chances of blowout by the way you orient the brad (photo, at right). The brad is guided by its vee-shaped tip, so any deflection almost always follows it. Orienting the brad so this tip is perpendicular to the outer edge of the workpiece will keep any deflection parallel to the edge and unlikely to blow through.

Even though you do everything right, blow-out can still occur—it's that unpredictable. Repair the damage by clipping the brad (photo, bottom left). Don't try to pull it through or back it out—you'll make things worse because the brad will bend and break.



CLIP OFF A PROTRUDING BRAD as close to the surface as possible. (Got your safety glasses on? Good.) Countersink the remaining metal and carefully glue the damaged splinters back in place over it, using a block of wood (with waxed paper between it and the damaged surface) to press everything flat; then clamp.



AVOID BLOWOUT by holding the nailer perpendicular to the outer edge of the workpiece. This orients the vee-shaped tip of the brad so any side-to-side deflection is contained within the wood. Hold the nailer level with the surface, so you shoot straight. **Always wear protection for your eyes and ears.**

Desirable Features

The latest generation of brad nailers is loaded with features. Some are innovative, all are beneficial.

A DRIVE-DEPTH CONTROL allows you to adjust how far the nail is driven below the surface. The easiest ones to operate have a threaded adjustment wheel.

A WINDOW in the magazine lets you see when it's time to reload.

A NOSE PAD protects the workpiece from impact bruises.

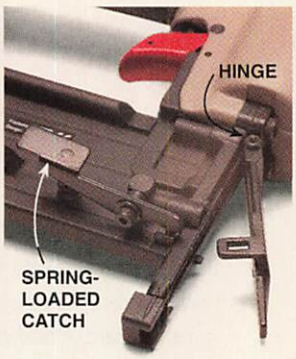




A NOSE-MOUNTED SAFETY is the best trigger lock mechanism. The trigger remains locked until you depress the spring-loaded safety onto the workpiece. Only then can you drive a brad. A safety that's mounted behind the driver shaft, like this one, is better for bench work because it doesn't obscure your view of the drive point.

A "RESTRICTIVE-FIRE" TRIGGER is safest because it allows you to shoot only one brad at a time. You can't shoot again until you release the trigger **and** reset the safety, which requires lifting the nailer off the wood. This eliminates the risk of a dangerous "double fire."





HINGED, QUICK-RELEASE LATCHES provide the fastest access for clearing jambs from the guide shaft. On some tools the quick release isn't hinged and some tools require using an Allen wrench for access.

A REAR-DIRECTED EXHAUST PORT is an innovative design that means you'll never get a blast of air in the face. There's even a sponge muffler inside the vent to reduce the noise and the force of the exhaust. Other nailers have an adjustable port mounted on top of the cylinder.

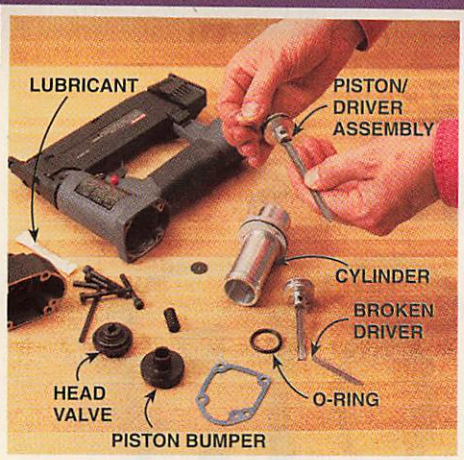




A PACKAGE DEAL, including nailer and compressor can be a good buy if you don't already own a compressor. On sale, this combo was only $300.

RULES FOR SAFE OPERATION

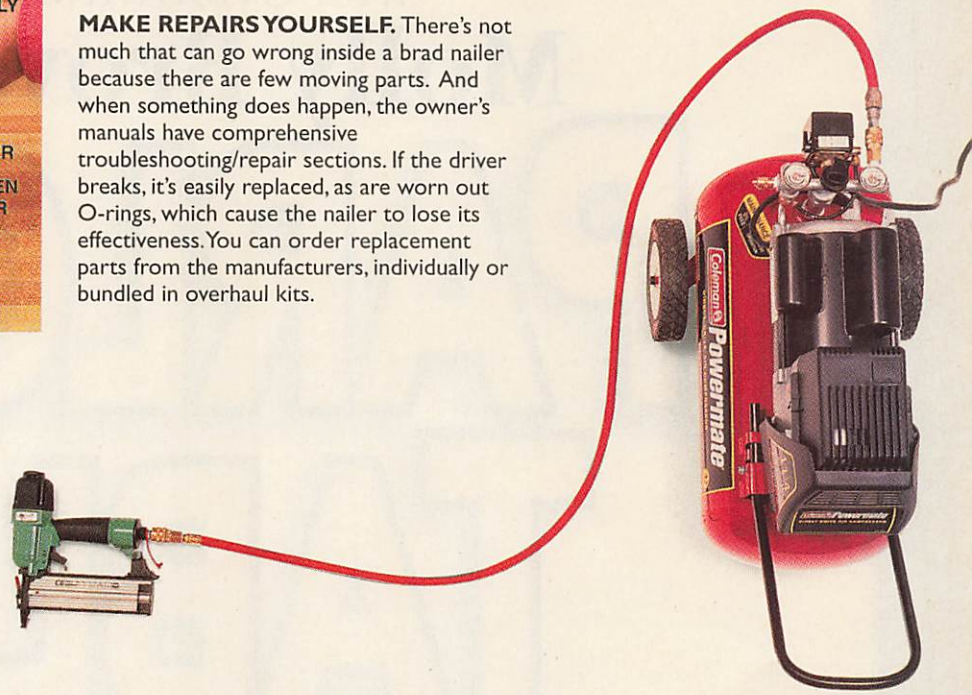
Driving a brad with pressurized air requires a lot of force. It's noisy—each shot can exceed 90 db—and misfires are possible. A brad can deflect out the side of the workpiece or come flying back at you at terrific speed. ALWAYS WEAR PROTECTION FOR YOUR EYES AND EARS and KEEP YOUR FREE HAND AWAY FROM THE PATH OF THE BRAD.



MAKE REPAIRS YOURSELF. There's not much that can go wrong inside a brad nailer because there are few moving parts. And when something does happen, the owner's manuals have comprehensive troubleshooting/repair sections. If the driver breaks, it's easily replaced, as are worn out O-rings, which cause the nailer to lose its effectiveness. You can order replacement parts from the manufacturers, individually or bundled in overhaul kits.

THE WHOLE PACKAGE

A compressor provides pressurized air for the nailer through a supply hose equipped with quick-connect fittings. Contractors often use "pancake-style" models ("A Packaged Deal," bottom left) because of their compact size and portability, but shop around—a bigger unit, with more power and a larger reserve tank (at right) may cost less.



RECOMMENDATIONS

Each nailer is a unique package. They vary in size and weight, and in the design and number of features included as well.

Look for a brad nailer that's comfortable to hold, especially when it's attached to an air hose. A restrictive-fire trigger coupled with a nose-mounted trigger lock is the safest combination. Quick-release jamb clearance mechanisms make sense, even if jambs are infrequent. The easiest ones to use are hinged. A threaded drive-depth control is convenient for making small adjustments, but you'll still need to regulate the pressure at the compressor when you change from one brad size to another.

To produce an affordable, good quality brad nailer, most manufacturers have stayed with tried and true designs, refining the components to enhance performance. Porter-Cable has made the most of this approach. The result is a nailer that combines light weight with an abundance of well-designed features and excellent performance. Other manufacturers have concentrated on price. Grizzly, Hitachi and Airy nailers can be found for under $100. The design of the Accuset nailer is new and innovative, inside and out. It has the only rear-directed exhaust port, and couples a restrictive-fire trigger with a low-impact, trigger-controlled return stroke. These are three excellent features.

A brad nailer isn't the first tool to buy for your workshop. But after you've acquired a core of woodworking machines, adding air power is worth thinking about. There's a whole world of air-powered tools for woodworking, from spray guns for finishing to vacuum bags for veneering; from sanders to routers (these last two require at least a 5-hp compressor). Once you've got a compressor and hose, the door is open to renting or buying other members of the nailer family (trim, framing, or roofing nailers) for serious remodeling and home improvement projects. AW

SOURCES & STREET PRICES

Accuset
(888) 222-8144
www.accuset.com
Model A200BN, $125
5/8-in. to 2-in. brads
70-120 psi, 3.41 lbs.

Airy
(562) 926-6192
Model ATT-0249SRK, $98
3/8-in. to 2-in. brads
55 to 95 psi, 3.1 lbs.

Campbell Hausfeld
(800) 543-6400
www.campbellhausfeld.com
Model NB004000, $129
5/8-in. to 2-in. brads
70 to 110 psi, 2.8 lbs.

Grizzly
(800) 523-4777
www.grizzlyindustrial.com
Model G6047, $90
62 to 115 psi, 2.97 lbs.

Hitachi
(800) 706-7337
Model NT50AE, $95
5/8-in. to 2-in. brads
70 to 120 psi, 3.2 lbs.

Makita
(800) 4-MAKITA
Model AF503, $129
5/8 in. to 2 in. brads
60 to 115 psi, 3.1 lbs.

Porter Cable
(800) 487-8665
www.portercable.com
Model BN200A, $130
3/4 in. to 2 in. brads
70 to 120 psi, 2.75 lbs.

Sears Craftsman
(800) 377-7414
Model 351.184240, $149
5/8 in. to 2 in. brads
60 to 100 psi, 2.6 lbs.

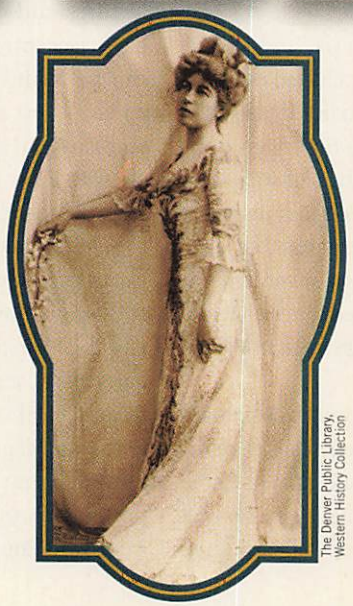
Stanley Bostitch
(800) 556-6696
Model SB-1850BN, $125
5/8-in. to 2-in. brads
70-100 psi, 2.69 lbs.

the Unsinkable

Molly Brown's PARLOR TABLE

by Tim Johnson

This table is an accurate reproduction of one purchased by Molly Brown and her husband in the late 1880s, when they were starting their family in the rough mining town of Leadville, Colorado. It easily disassembles for transport so it could lend instant civility to a new home in unfamiliar surroundings. Simply but ingeniously built, it bears all the hope and exuberance of a young America during its age of westward expansion.



The Denver Public Library, Western History Collection

Apparently the Browns liked this table. They kept it with them even after they struck it rich, and moved from Leadville to a large house in Denver's most prestigious neighborhood. It still resides there, in what is now the Molly Brown House Museum.

Rigid and durable, this table is built with the simplest joinery. You'll only need about 15 board feet of 3/4-in.-thick walnut, and you can build it in a weekend using your tablesaw, bandsaw, router and drill.

This little charmer folds flat, then sets up in seconds.

1. Unfold the legs



ART DIRECTION: JOEL SPIES • PHOTOGRAPHY: MIKE HABERMANN • ILLUSTRATION: FRANK ROHRBACH



2. Install the notched shelf



3. Put the top in place

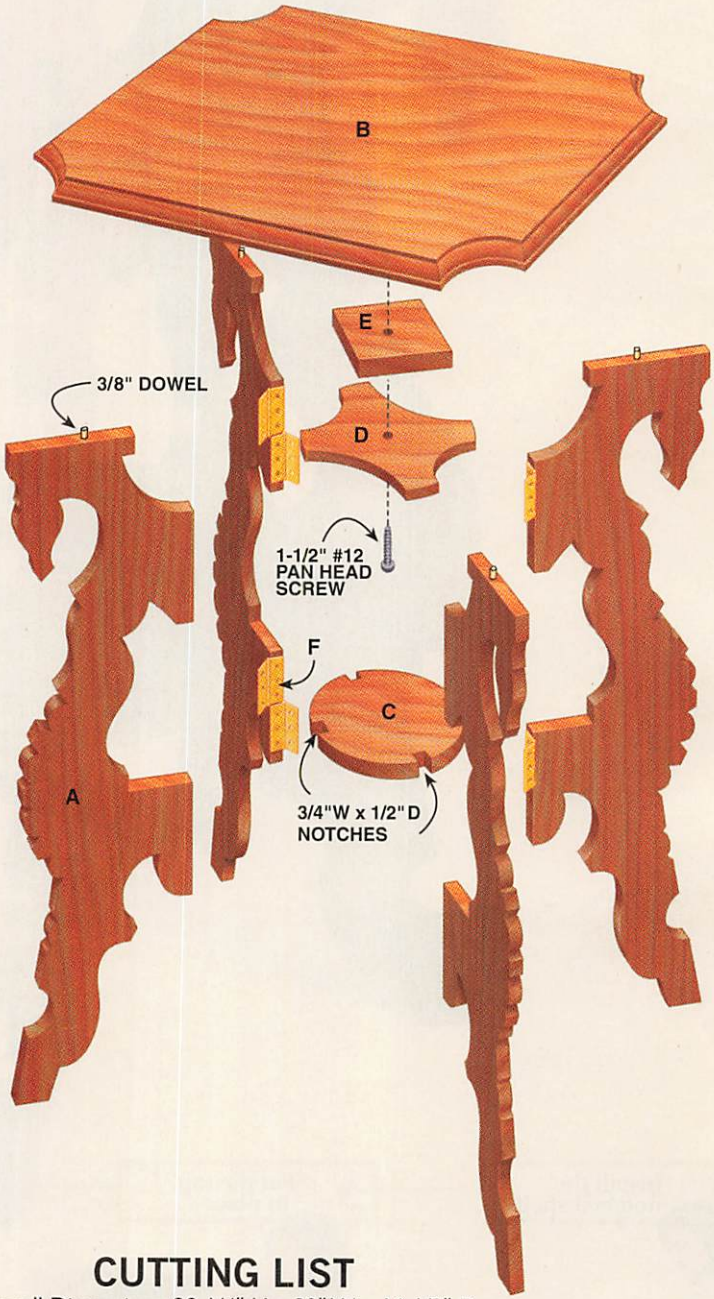


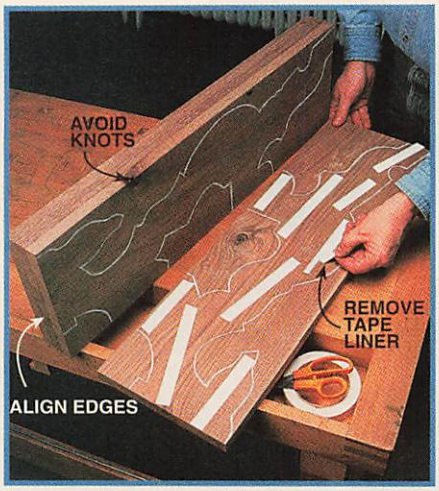
4. Lock the legs and top together



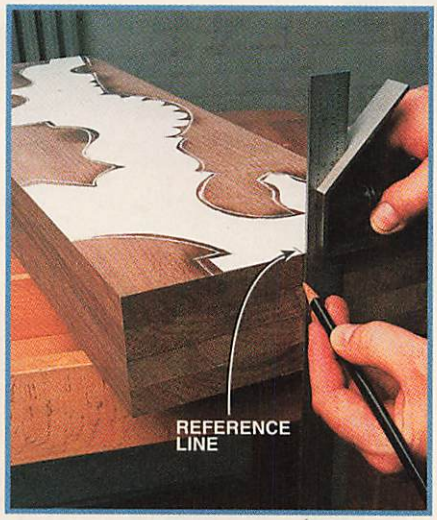
Fig. A | Parlor Table Exploded View

Hinges, dowels and friction hold this table together. There are only eight parts and you can make four of them at once. With simple changes, this table could be square, round or half round.





1. HOLD THE LEG BLANKS TOGETHER with double-stick tape (see Sources, p. 56). Using the paper pattern at right, outline the leg on each blank. This keeps the blanks properly oriented and shows you where to put the tape. Press the blanks together, one pair at a time. Keep the back edges of the blanks aligned by standing them on a flat surface. Align the end-grain edges with your fingers and then press the blanks together. Glue the paper pattern on the completed stack, aligning it with the edges (Photo 2).



2. TRANSFER THE LINE for the dowels onto all four blanks at once, using the reference line on the paper pattern. Before making these marks, true up the ends of the stack on the tablesaw, using the miter gauge, if necessary.

CUTTING LIST

Overall Dimensions: 28-1/4" H x 22" W x 16-1/2" D

Part	Name	Qty.	Dimensions
A	Legs	4	3/4" x 8" x 27-1/2"
B	Top	1	3/4" x 16-1/2" x 22"
C	Shelf	1	3/4" x 7-1/2" dia. round
D	Lock	1	3/8" x 6-5/8" dia. round
E	Block	1	3/4" x 5" x 5"
F	Hinges	6	2" L x 1-1/2" W dull brass

Making the Legs

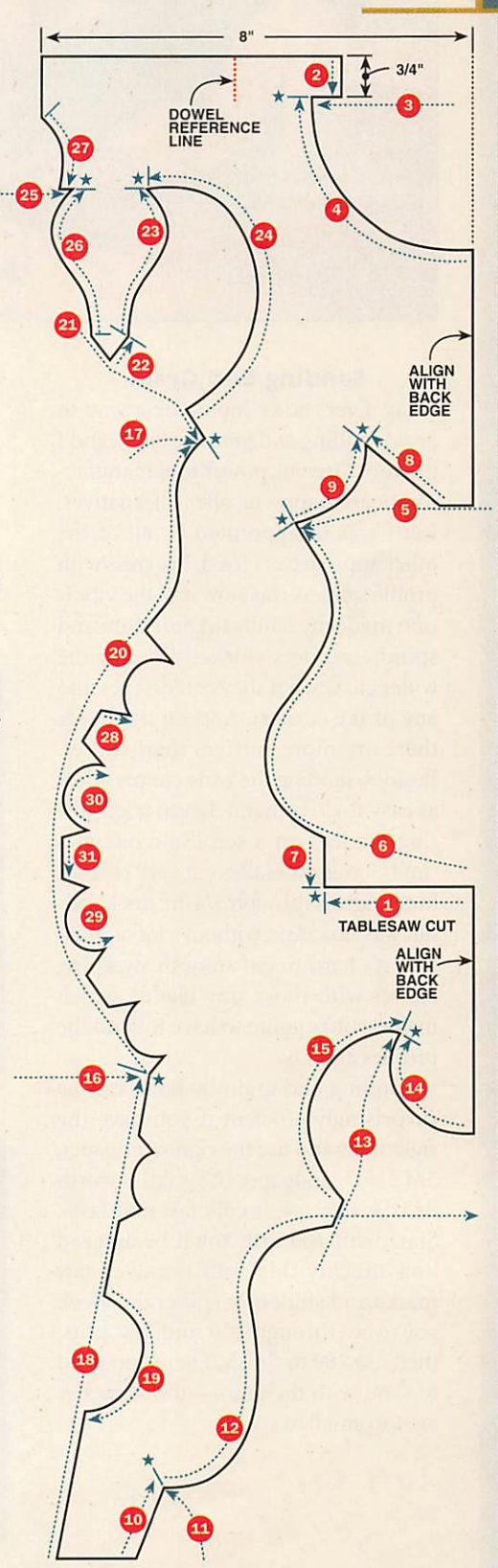
Look for boards without sapwood that are 8-1/2-in. wide, otherwise you'll have to glue pieces together. You can saw the legs individually, but it's better to saw all of them at once. Stack the four leg blanks together, using pieces of double-stick tape (Photo 1). Keep the edges aligned. Then affix a full-size paper pattern on one side (Photo 2) and saw out the legs (Fig. B and Photo 3).

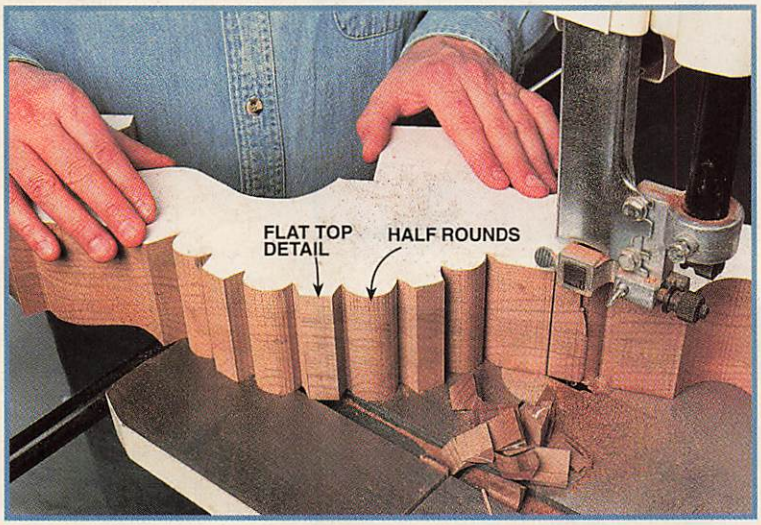
Sawing the ganged-together leg blank on the bandsaw is a simple combination of curved cuts, access cuts and relief cuts. To be successful, it's important that your saw is in tune (see AW #25, p. 18 for how-to) and the blade is sharp. A 3/16-in. 4-tpi skip-tooth blade (see Sources, p. 56) will do a good job. To make accurate cuts with smooth curves, it's also important for you to be in tune with the saw. Use a light touch so you can find the blade's optimal feed rate and see how it tracks. Then advance the workpiece steadily—don't try to cut too fast—and let the saw do the work. Make access cuts first. They allow the blade to escape from dead-end curved cuts easily.

After sawing, clamp the legs in a vise and sand the edges (Photo 4). Attach the hinges (Photo 5), then pry the legs apart. Use a putty knife with blunted edges and smooth faces—any burrs on the knife will scratch the wood. After the legs are loose, remove the paper pattern and any double-stick tape that remains. Then sand the faces.

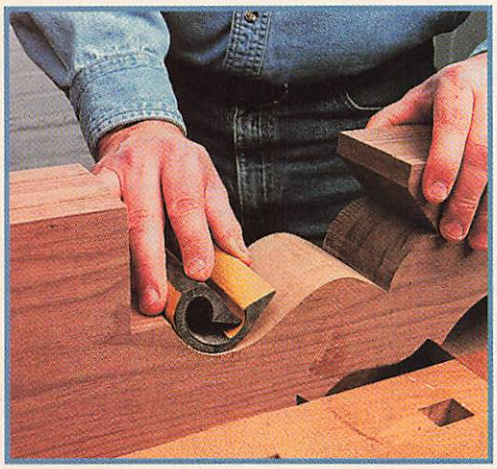
Fig. B | A Pattern and Plan for Cutting the Leg

Enlarge this pattern to 200 percent. Take the enlarged copy and enlarge again at 170 percent. Cut out and glue the pattern to the leg blanks. The sequence of all the cuts you'll need to make is shown right on the pattern. Stars mark points where you need to make access cuts. Just follow the numbers to cut out the leg. Cut #1 is best done on the tablesaw. Do the rest of the cutting on the bandsaw. If you have a 14-in. saw, you can cut out the entire leg without flipping it over. There is only one critical dimension. The tongues at the top of the legs (cut #2) must be 3/4-in. wide for the lock block (Fig. C) to work properly (Photo 10).



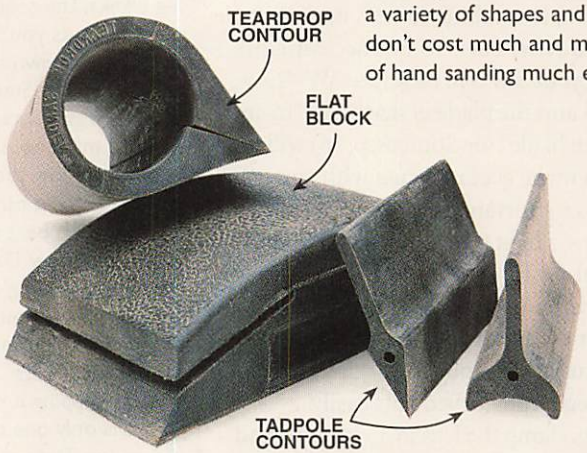


3. SAW THE SMALL DETAIL SHAPES at the front of the legs in three steps. FIRST, saw the edges of the flat-topped details (Fig. B, 28). SECOND, make a relief cut, sawing into one corner of each half-round detail, creating a notch for the saw blade (Fig. B, 29). THIRD, saw the half-round profile, starting at the newly created notch and working in the opposite direction (Fig. B, 30).



4. YOU'LL BE AMAZED how quickly and accurately you can smooth and level all four legs at once, using rubber sanding pads and 3M 216U Production RN Fre-Cut sandpaper (see Sources, p. 56). This teardrop sander is perfect for the job because it acts like a flexible sanding block, conforming to all sorts of contours.

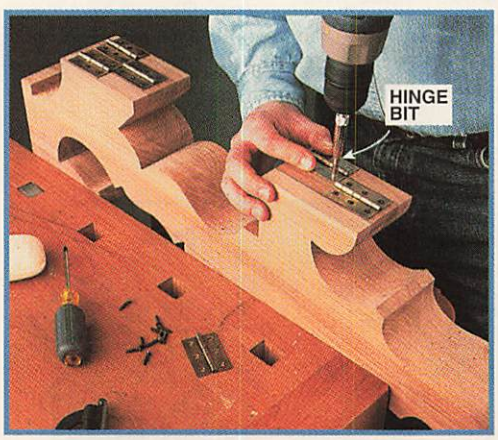
Flexible Rubber Sanding Pads (see Sources, p. 56) come in a variety of shapes and contours, don't cost much and make the job of hand sanding much easier.



Sanding End Grain

Okay. Everybody looks for a way to avoid sanding end grain by hand, and I did too. After all, power tool manufacturers are happy to offer alternatives. But I was disappointed by all of the other approaches I tried. Progress with profile sanders was slow and the vibration made my hands tingle. Drum and spindle sanders worked fine for the wider curves, but they couldn't get into any of the corners. And on these legs there are more corners than curves. Besides, sanding the wide curves is just as easy to do by hand. I even tried cutting the legs on a scrollsaw, one at a time. Scrollsaw blades cut very cleanly, but progress through 3/4-in. thick walnut was slow. And without a lot of practice, it's hard to cut smooth sweeping curves with those tiny blades, which means you're going to have to sand the profiles anyway.

Sanding end grain by hand can be surprisingly efficient if you have the right tools and use the right sandpaper. 3M 216U sandpaper (it's gold) is worth its cost because it cuts fast and lasts. Start with 100 grit. You'll be amazed how quickly this stuff removes saw marks and smoothes end grain. Work your way through 120 and 180 grits, then use 280 to finish. There's no need to sand with the grain—the scratches are too small to see.



5. MOUNT THE HINGES while the legs are still fastened together. Center the barrel of each hinge over its joint. Pre-drill holes for screws with a #5 self-centering hinge bit. Use the same mounting pattern on both parts of the legs.



6. SAW AWAY the corners of the top. Be sure to draw diagonal reference lines for locating the base before you cut the corners off. Lines drawn with colored chalk pencils (see Sources, p. 56) show up great on dark woods like walnut.

Attach the Legs to the Top

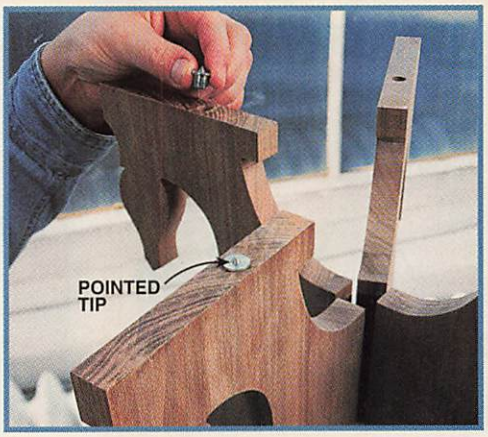
First, make the top, a rectangle with radiused corners (Photo 6). Rout the top edge with a 3/8-in. beading bit. Using a doweling jig, drill dowel holes in the legs, transfer their location to the top (Photos 7 and 8), and drill these holes. Then glue dowels into the legs. Make the lock block (Fig. C and Photo 9) and install it. Then fit the legs to the top, and test the locking operation.

A Notched Shelf Stiffens the Legs

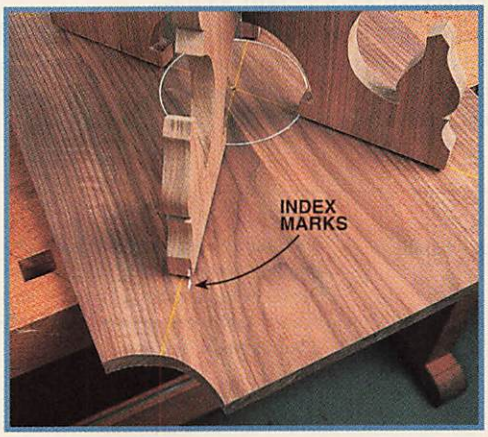
Use the top as a template to make the notched shelf (Photo 10). For the notches to slip around the legs without being too loose, saw on the insides of the lines you've drawn on the shelf. Test the fit on the assembled table. If the fit is too tight, widen the notches slightly with sandpaper or a file. If it's too loose, just make another shelf. (That's what I had to do!)

A Canned Finish

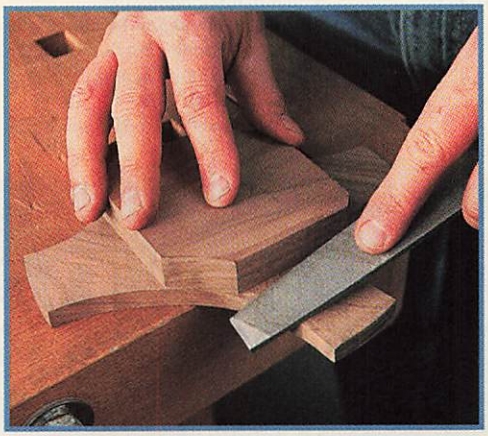
This project begs for a spray finish. Brushing the legs would be a drippy nightmare and oil would make the end grain too dark. I used shellac, sprayed from an aerosol can as a seal coat. First I folded the legs together and sprayed all the end grain edges at once. Then I opened them up and sprayed the faces. It took only 10 minutes. The next day, after a light sanding, I sprayed on a topcoat of aerosol polyurethane.



7. INSERT DOWEL CENTERS (see Sources, p. 56) in the holes drilled in the tops of the legs. Dowel centers are designed to transfer the location of dowel holes from one piece to another.



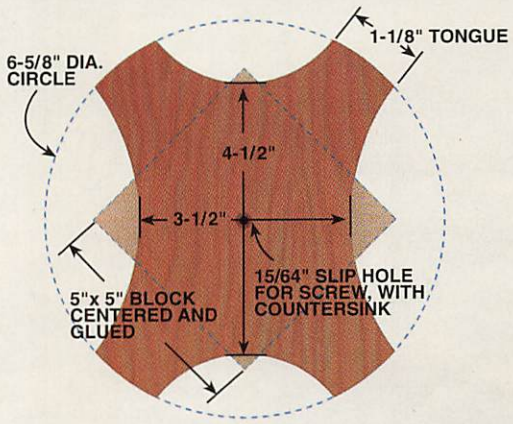
8. POSITION THE BASE on the top by centering it on a 5-3/4-in.-dia. circle. Then center each leg on its diagonal. Press or tap the base onto the top to set the points of the dowel centers. Mark both the top and one leg for reference. Remove the base and drill holes in the top for the dowels.

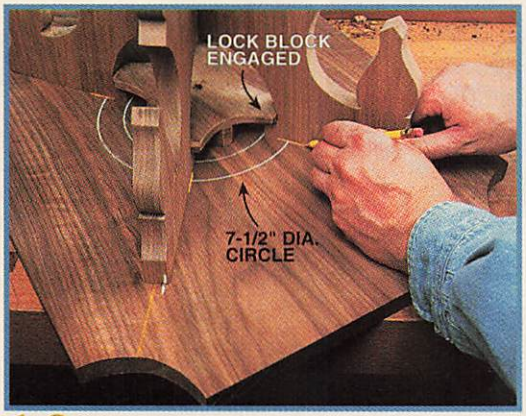


9. EASE THE EDGES of the lock block tongues so they'll engage the legs smoothly.

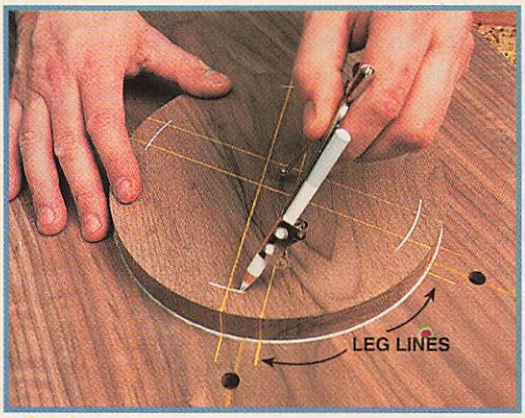
Fig. C | **The Lock Block**

The locking block swivels to lock the legs to the top. Center the block on the round lock blank and glue them together. Then drill the slip hole and cut the curved profiles.





10. USE THE TOP AS A TEMPLATE for the notched shelf that stiffens the legs. First, draw a second circle on the top that's the same diameter as the shelf. Then, with the table assembled, mark where the legs intersect this circle.



11. LOCATE THE NOTCHES in the shelf by centering the shelf in the circle drawn on the top and transferring the leg lines. Then draw another 6-1/2-in.-dia. circle to mark the bottom of each notch.

Sources

3M Scotch 666 double-stick (coated) tape, 3/4 in.
#910455, $8.54
Office Depot
(888) 463-3768
www.officedepot.com

3/16", 4 tpi bandsaw blade
#126171 (for 14" bandsaw), $11
Woodcraft Supply
(800) 225-1153
www.woodcraft.com

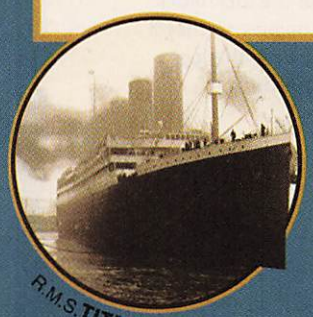
Brass butt hinges, satin finish, 1-1/2" x 2" about $4 per pair, three pairs needed
Dowel centers, about $4 per set, two sets needed. Get these at your local hardware store or home center

Flexible Sanding Pads
Tadpole contour sanders (complete set of 18 profiles), #KL50000, $18
Teardrop hand sander, #KL05245, $6
Flat rubber sanding block, #KL05215, $8
Klinspor's Sanding Catalog
(800) 228-0000
www.woodworkingshop.com

3M 216U Production RN Fre-Cut sandpaper, $ .50 per sheet
Tools on Sale, (800) 328-0457; www.7cornershdwe.com; also available from auto body supply stores

Chalk Marking Pencils
Available at art supply stores

Learn More About Molly Brown
Molly Brown House Museum
1340 Pennsylvania St.
Denver, CO 80203
(303) 832-4092
www.mollybrown.org



the Unsinkable Molly Brown



Young Margaret Tobin traveled west to Leadville, Colorado in 1886 to seek her fortune. Within a year she met and married J.J. Brown (13 years her senior), an engineer for the Ibex Mining Company. In 1893, thanks to a process J.J. devised, a played-out silver mine, called the Little Johnny, was found to have one of the largest veins of gold and copper ore in the country. The Browns became millionaires overnight.

In 1894 they moved to Denver, where Molly immersed herself in Denver society.

In 1912, she gained national recognition for her heroism the night of the Titanic disaster. Mrs. Brown found herself, with other horrified survivors, adrift on a lifeboat. Taking command from the panicked sailor in charge, she began rowing and instructed others to do the same, safely piloting the boat through the icy darkness. Later she raised $10,000 for families of victims.

She was an excellent fund-raiser for charitable causes in Denver, where she was a champion for miners and orphans. Fiercely independent and outspoken, she ran for the Senate before women had the right to vote. She was named to the French Legion of Honor for her work entertaining soldiers in WW I.

Not even the largest ocean liner disaster the world had ever known could stop the Unsinkable Molly Brown! AW

Titanic photo courtesy of National Museums & Galleries of Northern Ireland, Ulster Folk and Transport Museum. Molly Brown photo courtesy of Denver Public Library, Western History Collection.

Lock Miters



A lock miter router bit.

By George Vondriska

This simple set-up process guarantees *perfect* joints!

Lock miters are strong, attractive joints that make assembly easy. So why the heck don't we use lock miters more? I think it's because they can be a pain to set up. Well, no more excuses. Here's a clever technique, sent to us by Jim Rodgers of Martinez, California. Give it a try and you may become a lock miter enthusiast.

What's a Lock Miter?

A lock miter router bit cuts a 45-degree miter with a tongue and groove. When correctly cut, the parts go together at a perfect 90-degree angle and the interlocking tongues and grooves make for lots of mechanical strength and glue surface area. Lock miters are also great at keeping parts aligned during assembly. Use this joint on drawers, boxes or even hollow columns like newel posts. You can cut a lock miter on end grain, as shown in our photos, or on the long grain. Almost anyplace you'd use a miter, you can successfully use a lock miter.

Tooling Up

Lock miter bits come in a range of sizes. The size you use depends on the thicknesses of your wood. Even the smallest lock miter bit makes a substantial cut, so I prefer bits with a 1/2-in. shank. They're more stable and result in smoother cuts. Expect to pay $50 to $100 for a bit, depending on the size.

Note: The maximum size lock miter bit you can run in a 1-1/2-hp router is the 2-in. diameter. Larger bits must be run in a 2-hp or higher machine.

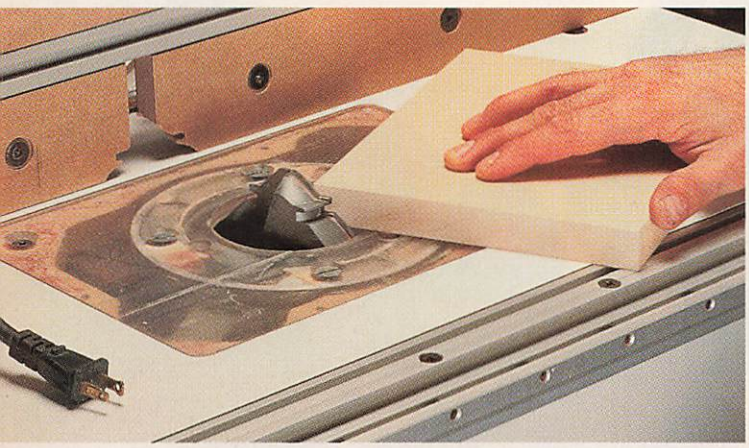
It is essential that you run these massive cutters at the right speed—about 10,000 rpm. Your router must have variable speeds so you can slow down for these big cutters.

The Perfect Set-Up

Follow the sequence shown in Photos 1 through 7 to produce perfect lock miters on your router table. Remember to have on hand the material required for your project plus six test pieces. It's critical that the test pieces be the same thickness as the project pieces because the bit set up is specific to the thickness of your material. As you get more familiar with the set up procedure you'll need fewer test pieces.

ART DIRECTION: PATRICK HELF AND BARBARA PEDERSON • PHOTOGRAPHY: BILL ZUEHLKE • ILLUSTRATIONS: FRANK ROHRBACH

First, center the bit on the material.



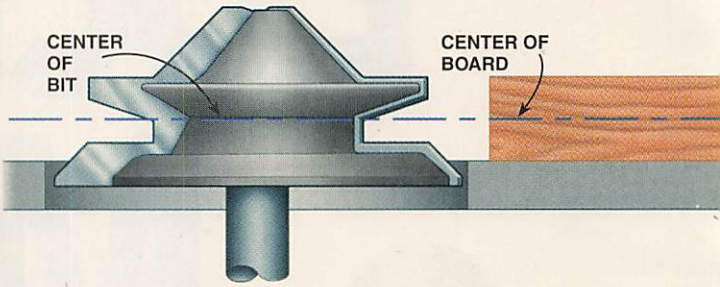
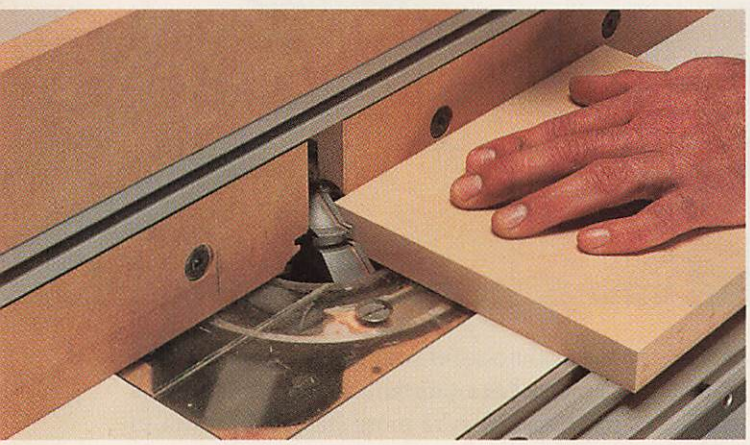


FIG. A **Centering the Bit**
The router bit is properly set when the center of the bit profile lines up with the center of your material.

1 **CENTER THE BIT** on your workpiece by eye. Be sure your router is unplugged.



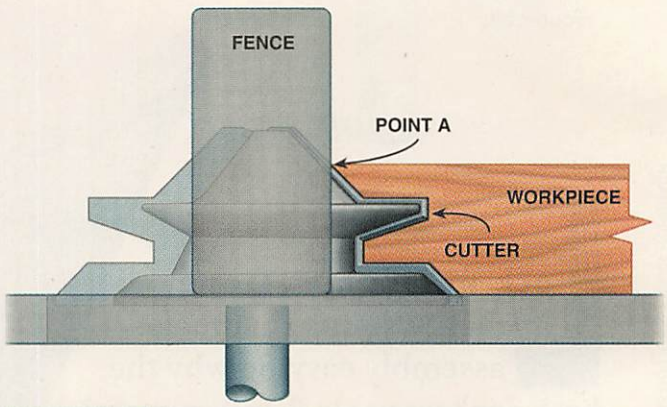
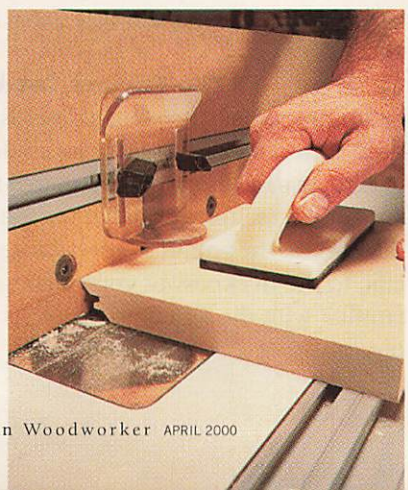
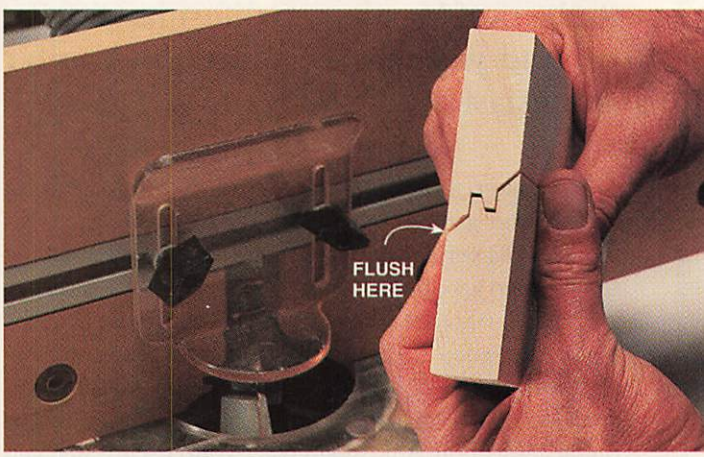


FIG. B **Fence Position**
The correct fence position has cutter, fence and top of workpiece all intersecting at Point A.

2 **ADJUST THE ROUTER TABLE FENCE** by eye to its approximate position. Three points must be aligned. The top of the workpiece, the face of the fence and the 45-degree angle of the cutter (Fig. B). This is just a preliminary set up. You'll perfect the fence position later.

3 **TEST THE HEIGHT** of the router bit by cutting two test pieces. Hold each piece flat on the router table.

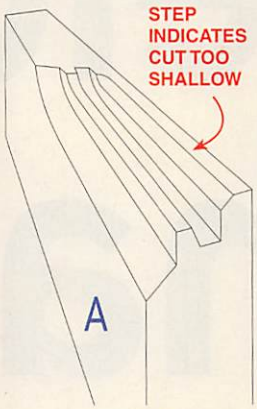


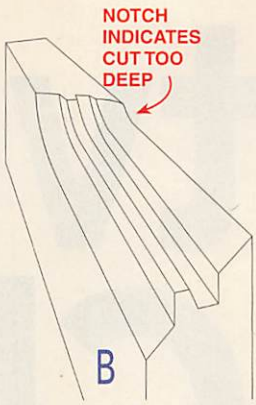


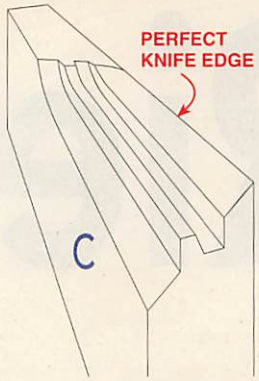
4 **ASSEMBLE THE TEST PIECES.** When the cutter is perfectly centered, the faces of the two pieces will be aligned. Adjust the bit as needed. **You must have the bit centered on the material before you start working on the fence position.**

Now, set the fence position.

5 EXAMINE THE TEST CUTS to determine if the fence is correctly positioned. If the cut looks like A, the cut is too shallow and the fence must be moved back. If the cut looks like B, the cut is too deep and the fence must be moved forward. Adjust the fence until the cut looks like C; producing a perfect knife edge on the cut.





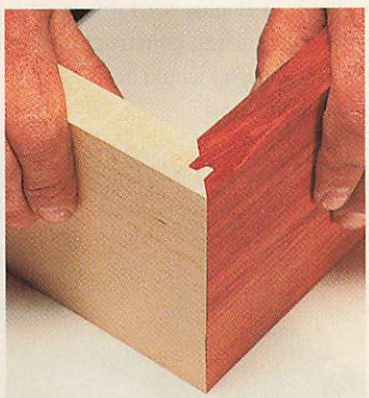


Finally, cut your parts.



6 MACHINE YOUR PARTS. One part is held flat on the table. The mating part is held vertically against the fence.

7 ASSEMBLE THE PIECES. Your careful machining will result in perfect-fitting corners.



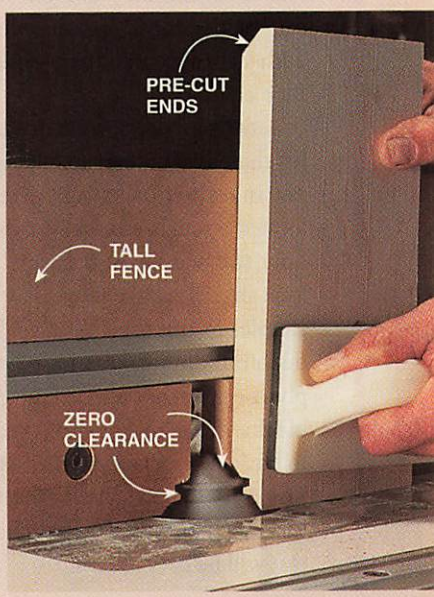
Sources

Router Bits:
CMT, (888) CMT-BITS
Eagle America, (800) 872-2511
Jesada, (800) 531-5559
MLCS, (800) 533-9298
Whiteside, (800) 225-3982
Woodline Arizona, (800) 472-6950

Push Blocks:
Eagle America, (800) 872-2511

Lock Miter Tips

If you follow the steps you'll be able to cut perfect lock miters. Here are some tips to make it even easier:



Use wide pieces. Your project parts must be cut to the right length before cutting the lock miters, but they can be any width. Leave them 1 in. too wide, and cut them to final width after you've done the routing. They'll be easier to handle, and the "blowout" you get on the back of the cut will be cut off when you machine to final width. If your project calls for narrow pieces, 2 in. to 3 in. wide, machine pieces 6 in. to 7 in. wide and rip them to the size you need.

Use a tall fence. Holding a piece vertically against the fence is a lot easier if the fence is high. Use one that's about 7-in. tall.

Use a "zero clearance" fence. Having the opening surrounding the bit as small as possible helps prevent your workpiece from slipping into the opening.

Precut your parts. A 2- or 3-hp router will hog all the material off in one pass, but it's going to be a lot easier to machine the lock miter if you precut your parts on the tablesaw with a 45-degree bevel. Trim off only about 3/8 in. on 3/4-in. stock.

Use push blocks. Neoprene-padded push blocks will make cutting lock miters easier and safer (see Sources, at left).

Make a permanent set up piece. When you have all the setup done, machine a piece and keep it for your next project. If you want to set up the whole operation for the same thickness of material again, use the set up piece to set the thickness of your work, the height of the bit and to position the fence. You'll still need to do some test cuts and some final tweaking, but you'll be darn close. AW

Rietveld Chair

IN 1918 the Dutch cabinetmaker Gerrit Rietveld reduced the idea of a chair to a 3D grid of painted sticks and boards. His revolutionary design became one of the most famous pieces of 20th-century furniture—the Red-Blue chair.

Let's take a new look at it. Although his chair appears easy to put together, getting all those sticks precisely located is tough, especially if you have only two hands. And all the pieces look alike! To make this jigsaw puzzle simpler to put together, I've figured out a building system based on two plywood boards and a few spacing blocks. If, like most people, you want to build a bunch of chairs instead of just one, this system is the ticket. Once you've built the first chair, the rest will be easy as ABC.

The Design

I've revised Rietveld's elegant design to make a chair that's stronger, easier to build, more comfortable to sit in and rugged enough to put outdoors. I've used screws instead of Rietveld's dowels to hold it together, increased the size of the sticks and added a stretcher. We tested our chair with both large and small people, and it gets two thumbs up for comfort. Some said it was perfect for leaning back and playing video games!

Tools and Materials

Building this chair requires only a minimum of tools and experience. You'll need a tablesaw, planer and router to mill the wood, and a #2 square-drive bit for your drill to put it together. That's it. A drill press and a router table are helpful, but not necessary.

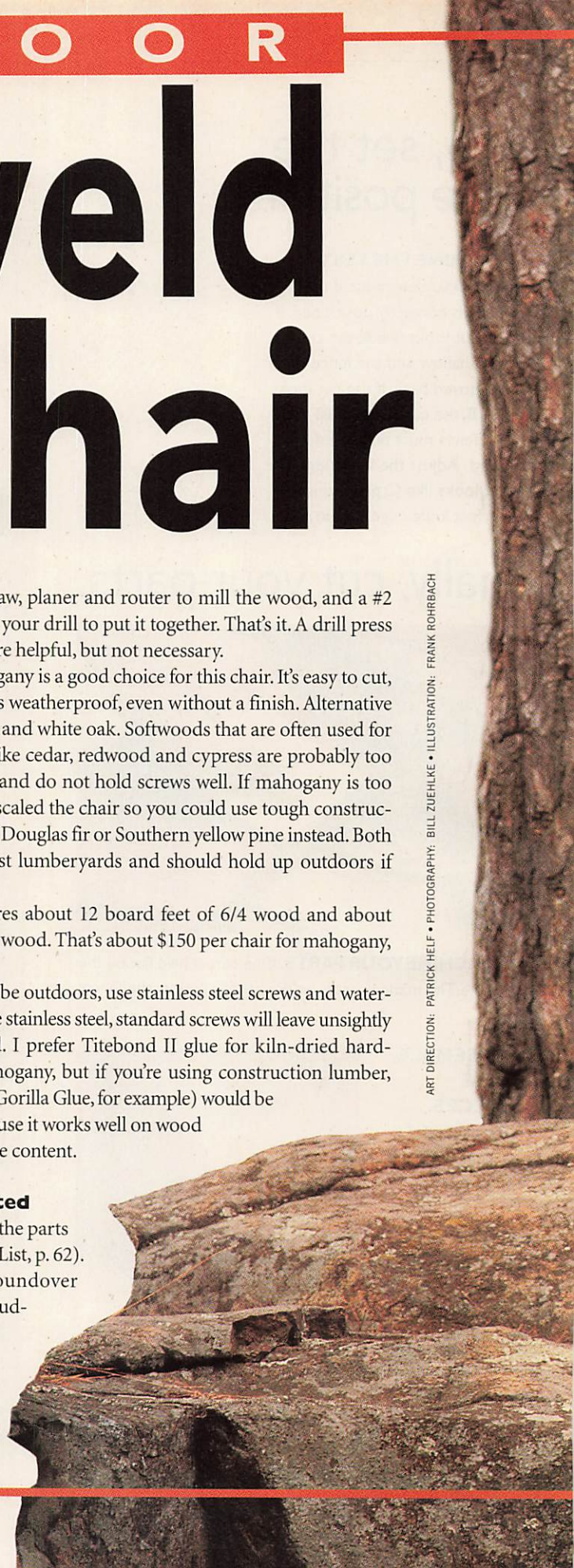
Honduras mahogany is a good choice for this chair. It's easy to cut, sands quickly and is weatherproof, even without a finish. Alternative woods include teak and white oak. Softwoods that are often used for outdoor furniture like cedar, redwood and cypress are probably too weak for this chair and do not hold screws well. If mahogany is too pricey for you, I've scaled the chair so you could use tough construction lumber such as Douglas fir or Southern yellow pine instead. Both are available at most lumberyards and should hold up outdoors if painted.

One chair requires about 12 board feet of 6/4 wood and about 10 board feet of 4/4 wood. That's about $150 per chair for mahogany, $50 for fir.

If your chair will be outdoors, use stainless steel screws and water-resistant glue. Unlike stainless steel, standard screws will leave unsightly stains on the wood. I prefer Titebond II glue for kiln-dried hardwoods such as mahogany, but if you're using construction lumber, polyurethane glue (Gorilla Glue, for example) would be a better choice because it works well on wood with a high moisture content.

Getting Started

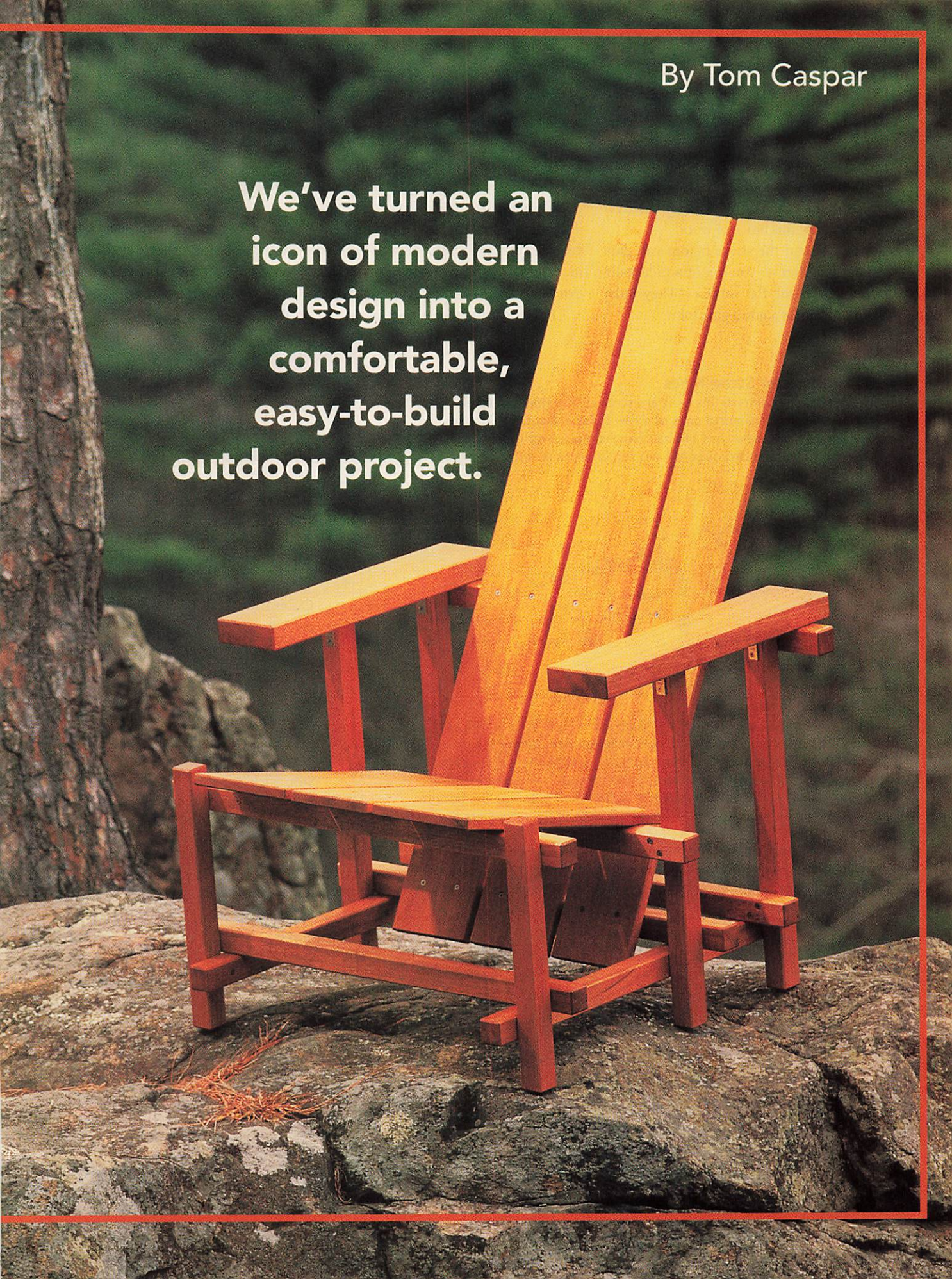
Begin by cutting all the parts to size (see Cutting List, p. 62). Rout a bevel or roundover on every edge, including the ends (Fig. C, Detail 1). A router table makes this repetitious job go much



ART DIRECTION: PATRICK HELF • PHOTOGRAPHY: BILL ZUEHLKE • ILLUSTRATION: FRANK ROHRBACH

By Tom Caspar

We've turned an icon of modern design into a comfortable, easy-to-build outdoor project.



faster. Make some extra legs and rails, too. You'll need them to make spacers (see Cutting List, below, right) and stop blocks. The spacer you'll use over and over again, spacer #1, is simply a scrap piece of rail. I added a tab to it to make it easy to use (Photo 3). Most of this chair's dimensions are based on multiples of this block of wood.

Don't sand the sticks before you glue them together, or you might accidentally round over the flat surfaces. They must remain flat for a good glue joint.

Now build the two gluing and screwing fixtures (Fig. E) and follow the photo sequence 1 through 12.

Finishing Touches

You don't have to apply a finish to your chair. Mahogany turns a silvery-gray color if left outdoors and stays sound for many years. However, if you'd like to preserve its original color, you can apply a clear exterior oil (see Sources, below) each year.

The most vulnerable part of an outdoor chair is the bottom of the legs. Moisture wicking up into the legs can support the growth of wood-destroying fungi. You can slow down that process by liberally coating the end of the legs with epoxy glue.

For More Information

You can see the Rietveld chair's original color scheme on the Web at http://www.levalet.com/DESF/IMAGES/RIET1-a.HTM.

FIG. A
Guide Block for Screw Holes

The overlapping joints in this chair are screwed and glued together. This block lays out diagonal pairs of screw holes in five rails (D). Use one side to mark either end of a rail. Flip the block over to mark the other end. Then the two diagonals will run in opposite directions.

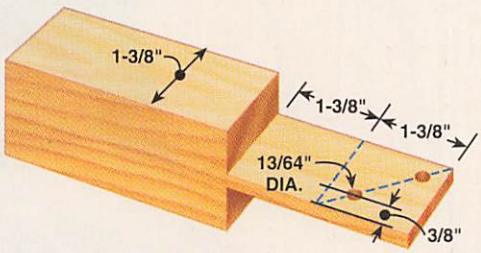
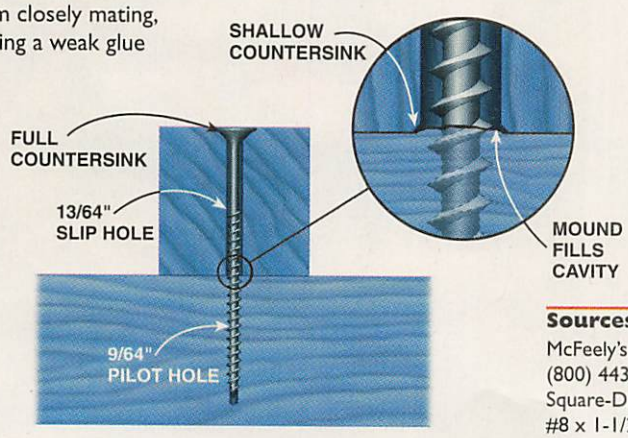


FIG. B
Good Screw Joints

For this chair to last, the screwed and glued joints must be as strong as possible. That means drilling two holes of different sizes before the joint goes together. First, a large diameter "slip hole" goes all the way through the top piece. The screw must be able to slip through it without threading into the wood. A small diameter hole, or "pilot hole," goes into the bottom piece. It should be about the same size as the shaft of the screw, less the threads.

Countersink both sides of the top piece. Here's why: When the screw is driven into the pilot hole a small mound of wood is formed. You create a cavity for this mound by countersinking. Without a cavity, the mound would prevent the two pieces of wood from closely mating, thus creating a weak glue joint.



CUTTING LIST
DIMENSIONS: 40" H x 30-1/4" W x 32" D

Part	Name	Qty.	Dimensions
A	Front Leg	2	1-3/8" x 1-3/8" x 14-3/4"
B	Arm Support	2	1-3/8" x 1-3/8" x 20-1/8"
C	Back Leg	2	1-3/8" x 1-3/8" x 20-1/8"
D	Rail	5	1-3/8" x 1-3/8" x 27-5/8"
E	Arm Rail	1	1-3/8" x 1-3/8" x 30-3/8"
F	Rail	2	1-3/8" x 1-3/8" x 24-7/8"
G	Arms	2	1-3/8" x 4-1/8" x 19"
H	Cleat	1	5/8" x 2-3/4" x 15-1/8"
J	Outer Back	2	5/8" x 5-1/4" x 42"
K	Inner Back	1	5/8" x 5-3/8" x 42"
L	Outer Seat	2	5/8" x 6-5/8" x 16-5/8"
M	Inner Seat	1	5/8" x 5-3/8" x 16-5/8"
Fixtures			
A	Between Legs	1	3/4" x 14" x 22-1/8"
	Stop Stick A	1	1-3/8" x 1-3/8" x 24-1/8"
B	Between Arms	1	3/4" x 16" x 19-3/8"
	Stop Stick B	1	1-3/8" x 1-3/8" x 21-3/8"
Spacers			
#1	Basic	3	1-3/8" x 1-3/8" x 3"
#2	Bottom Rail	1	1-3/8" x 4-1/8" x 19"
#3	Top Rail	1	1-1/8" x 1-3/8" x 18"
#4	Rail and Leg	2	3/4" x 6-5/8" x 9"
#5	Seat and Back	1	5/8" x 2" x 16"
Hardware			
2	Corner Brackets		1" x 1"
4	Corner Brackets		1-1/2" x 1-1/2"
38	#10 X 2-1/2" L Stainless Steel Screws		
20	#8 X 3/4" L Flathead Screws		
24	#8 X 1-1/2" L Flathead Screws		
6	#8 X 1-1/4" L Flathead Screws		
Materials: Mahogany or Douglas Fir			

Sources

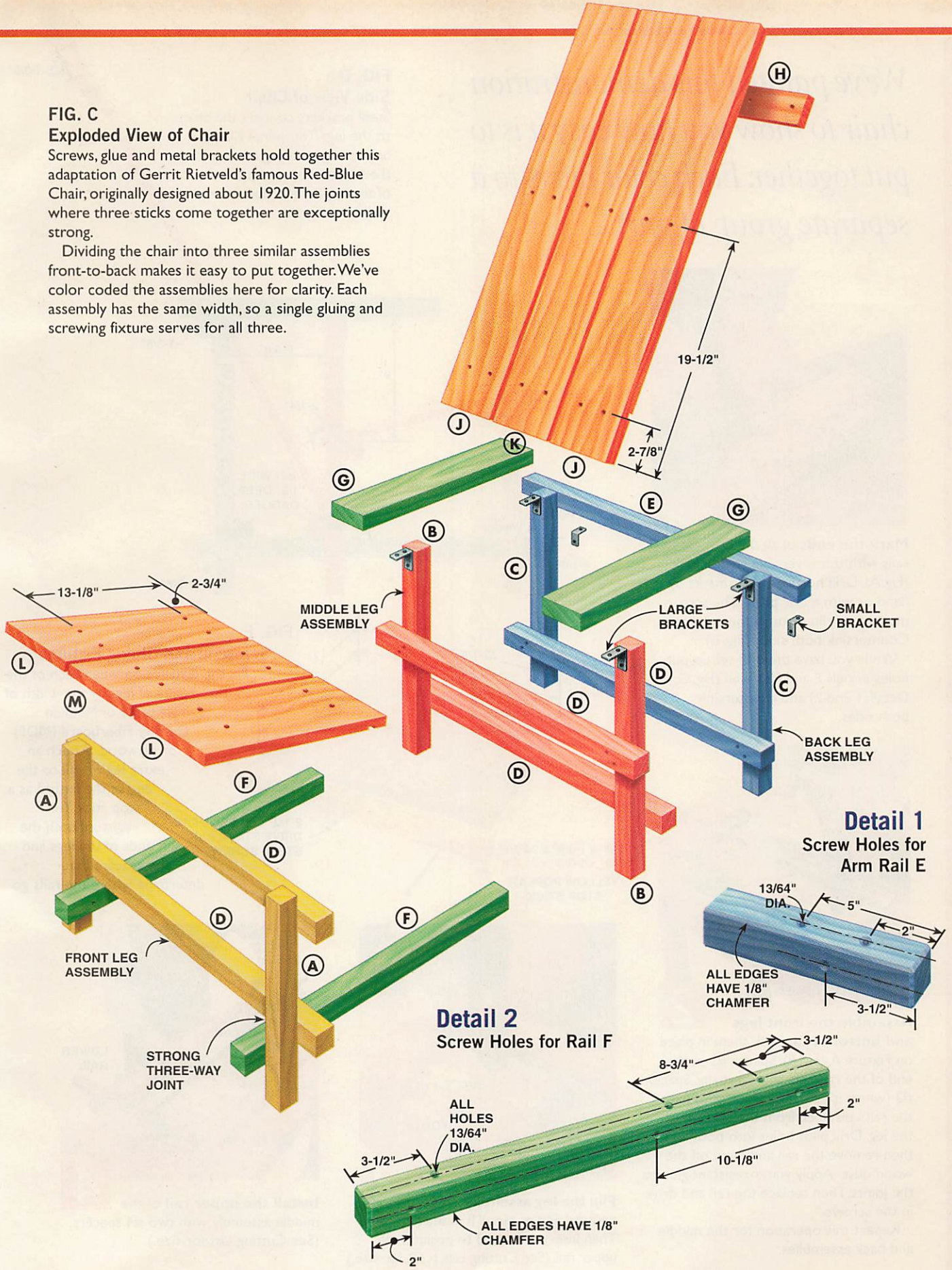
McFeely's
(800) 443-7937
Square-Drive Stainless Steel Screws,
#8 x 1-1/2" #0814-FSS, $8 /100
#10 x 2-1/2" #1024-FSS, $15/100

Performance Coatings
(800) 736-6346
Penofin Marine Oil Finish, $39.25/gal.

FIG. C
Exploded View of Chair

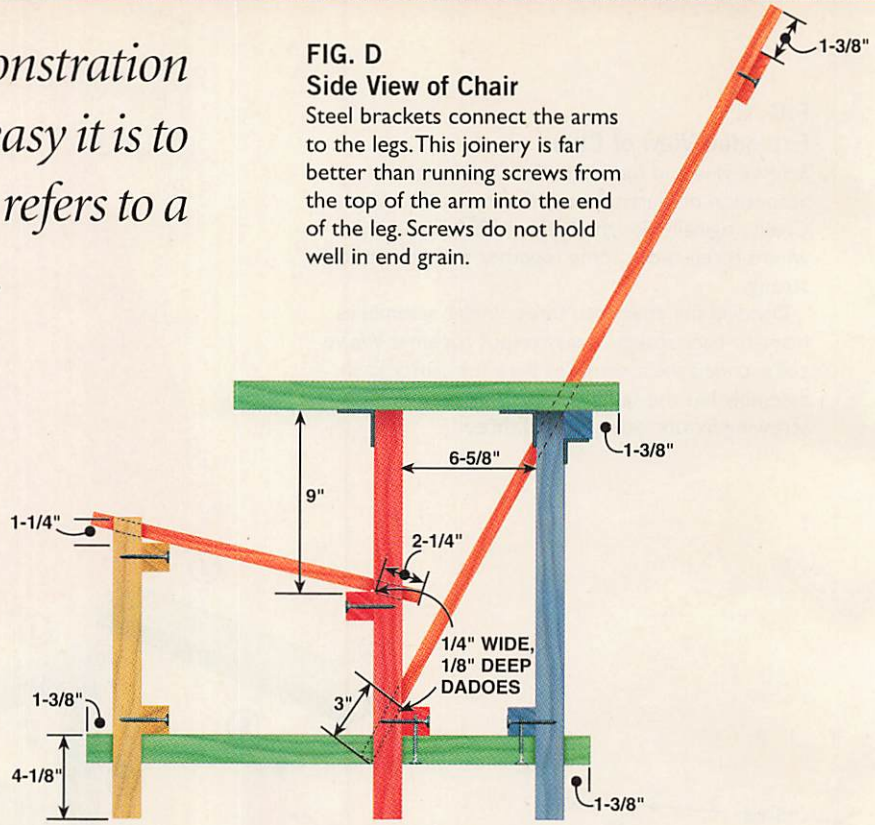
Screws, glue and metal brackets hold together this adaptation of Gerrit Rietveld's famous Red-Blue Chair, originally designed about 1920. The joints where three sticks come together are exceptionally strong.

Dividing the chair into three similar assemblies front-to-back makes it easy to put together. We've color coded the assemblies here for clarity. Each assembly has the same width, so a single gluing and screwing fixture serves for all three.



We've painted this demonstration chair to show you how easy it is to put together. Each color refers to a separate group of parts.

FIG. D
Side View of Chair
Steel brackets connect the arms to the legs. This joinery is far better than running screws from the top of the arm into the end of the leg. Screws do not hold well in end grain.





Mark the ends of all the D rails with this reversible guide block (Fig. A). Drill holes on your marks by hand or with a drill press. The screws must easily slip through these holes. Countersink both sides (Fig. B).

While you have the drill set up, put holes in rails E and F as well (Fig. C, Details 1 and 2) and countersink both sides.

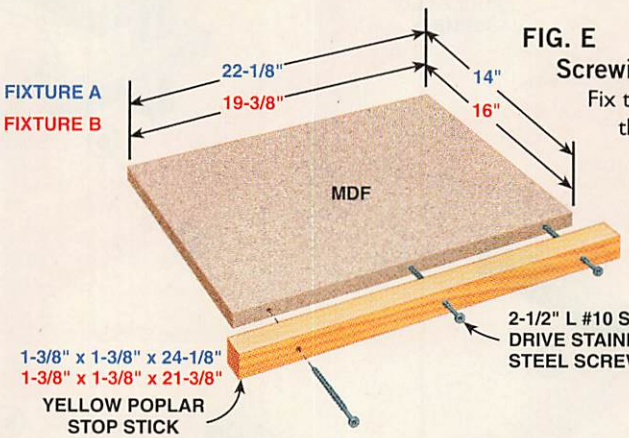


FIG. E
Screwing and Gluing Fixtures
Fix the distance between each of the three pairs of legs by the width of a single piece of Medium Density Fiberboard (MDF) or plywood. Attach an extra leg or rail to the end of the fixture as a stop stick. This registers both the ends of the legs and the spacers that determine where the rails go.

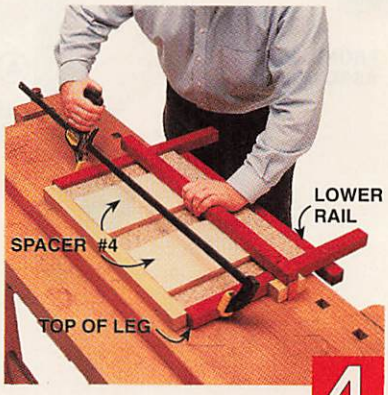


Assemble the front legs and bottom rail. Lock them in place on Fixture A (Fig. E). Spacer #1, at the end of the rail, sets the overhang. Spacer #2 (which is actually a chair arm) fixes the rail's distance from the bottom of the leg. Drill pilot holes into both legs, then remove the rail and blow off the wood dust. Apply water-resistant glue to the joints. Then replace the rail and drive in the screws.

Repeat this operation for the middle and back assemblies.



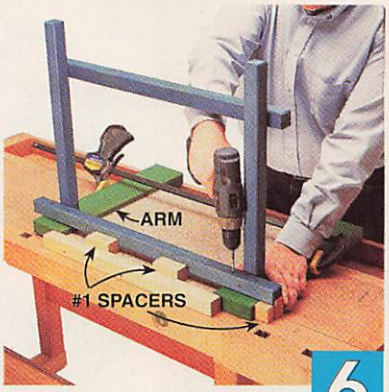
Flip the leg assembly around and re-install it in the fixture. Then insert spacer #3 to position the upper rail. (See Cutting List, p. 62, for size.)



Install the upper rail of the middle assembly with two #4 spacers. (See Cutting List for size.)



Butt rail E of the back assembly against the stop stick. Place two seat boards under the fixture to raise the stop stick to the level of the rail. Use two spacer blocks #1 to set the overhang.



Screw the back leg assembly to the arms. Clamp the arms in place across Fixture B. Spacer blocks #1 position the arm rail from the stop stick and set the overhang.

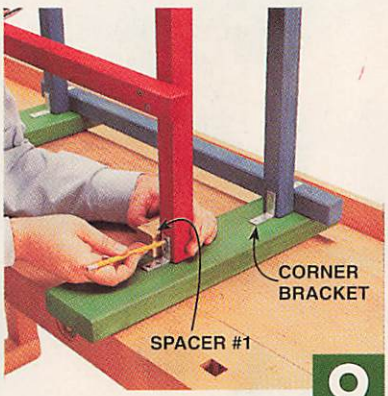


Clamp the middle leg assembly in place with spacer #4 (the same spacer you used in Photo 4, but turned the other way around). Spacer #1 sets the legs in from the arm's edge.

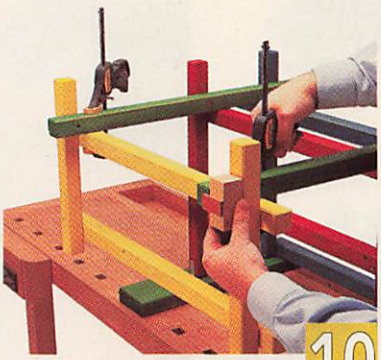


Drill pilot holes through rail F, then screw and glue it in place.

Repeat the same process on the other side of the chair and remove Fixture B.



Install three corner brackets on both arms (Fig. C). Use stainless steel screws if your chair's going outside.



Clamp the front leg assembly in place. Drill pilot holes into the legs and drive in two screws to temporarily hold the assembly in place. Then remove the clamps, drill the pilot holes into the front assembly's rail and remove the temporary screws. Apply glue to the assembly and drive in all the screws.



Add the backboards. Tilt the chair back on a support block made from the spacers. Pre-drill the holes in the backboards and cut registration dadoes in them (Fig. D). Then drill pilot holes into the chair rails and drive in the screws. This is not a glued joint.



Insert a thin spacer between the seat boards to keep them parallel. The seat is not glued to the rails.

Glue and screw the cleat behind the top of the backboards. AW



Shop Test



BELT SANDERS

by George Vondriska























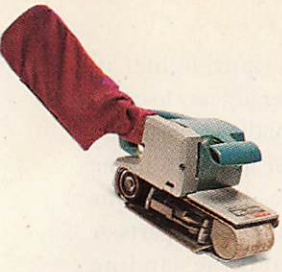








ART DIRECTION: JOEL SPIES • PHOTOGRAPHY: BILL ZUEHLKE

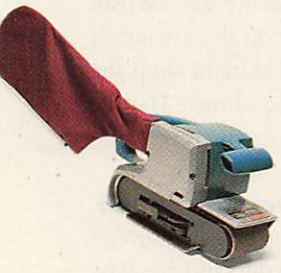








Which size and which motor style is more important than which brand.

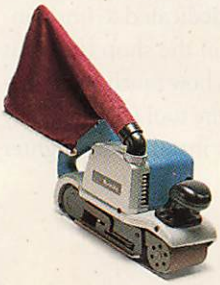


For the woodworker who's shopping for a belt sander, there's a bewildering array of models. We looked at 26 for this test, and that didn't include all of them. In this crowded field, finding the right *size* of sander is the most important choice.





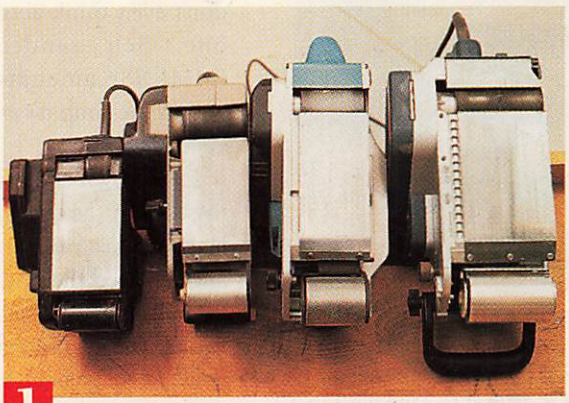




Pick the Size that Fits

Sanding belts (and sanders) come in four basic sizes (shown at right). The first number is the width of the belt, the second the length. Belt size determines the size of the platen; the plate on the bottom of the sander that holds the abrasive against the wood. So a bigger belt means faster sanding. It's also easier to keep a bigger belt flat on a surface.

On the flip side, bigger belts need bigger motors, which means added weight and size. Smaller sanders are easier to use on non-horizontal surfaces and are often preferred by cabinetmakers and carpenters who use them for scribing cabinets and countertops. Here are the four sizes:



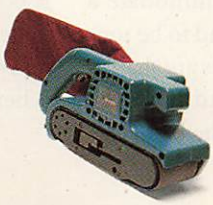
1 SIZE IS A MAJOR FEATURE. There is a trade-off: Large machines (3x24, 4x24) sand faster and are easier to keep flat on the wood; smaller sizes (3x18, 3x21), are lighter and easier to handle, especially on non-horizontal surfaces.

• **3 in. x 18 in.** Easy to handle because of its light weight. Great if you often use the sander on vertical or overhead surfaces. The platen is almost the same size as that on the 3 x 21, but these tools are light-duty and best for occasional use. We do not recommend them for regular shop use, because they're less useful for horizontal surfaces (the most common shop use). We have not included them in our chart.

• **3 in. x 21 in.** This size is closest to being general-purpose. The platen size gives you a pretty stable machine, without getting too heavy and bulky. If a do-it-all sander that's easy to handle is what you want, get a 3 in. x 21 in.

• **3 in. x 24 in.** The platen gets bigger, the amperage goes up, the sander gets heavier, all making this tool more suitable for horizontal surfaces while still manageable on vertical ones. This is a popular sander size in commercial shops and is an excellent choice if you are using it only in the workshop and have strong hands.

• **4 in. x 24 in.** The best of the bunch for big, flat







2 TRANSVERSE AND INLINE are the two basic designs. Transverse is more powerful, but less maneuverable. Inline is easier to handle and use upside down for small parts, but doesn't have as much power.



3 THE BIG MOTOR AND NARROW BELT found on some 3x24 sanders is a combination that yields great power, but the overlapping parts make it difficult to sand flush to a vertical surface.



4 A SANDING STAND is available on some models, or you can make your own. The stand makes it easier to hold the machine upside down for sanding small parts and sharpening.

horizontal surfaces. Harder to handle than the other sizes.

Bottom Line: For most people the choice will be between the 3x21 and the 3x24. The 3x21 is a more all-around choice, with the option of inline-design (see below). If you're going to use the belt sander for carpentry, home projects and cabinet installation, in addition to shop work, it is probably your best choice. The 3x24 is more of a dedicated shop tool, with superiority on horizontal surfaces. It's also more expensive.

Dust Collection is a Must

There are a number of belt sanders without dust bags, but don't even think about buying one. Belt sanders make IMMENSE amounts of dust, and in the shop it's essential to collect it.

In our own shop we've even tossed away the dust bags, which leak and are messy to empty, and replaced them with a shop vacuum and flexible hose. Try it; once you get used to the hose, you'll never go back to bags. All of these machines can be adapted to dust hoses, but some of the Makita sanders require you to make your own adapter. Swiveling dust ports are a real convenience and some machines are designed with dust bags that don't get in your way.

Inline or Transverse?

Transverse sanders are the most common type, with the motor on top of the sanding belt and a drive belt on the side connecting the motor and rear drum (Photo 3). They can accommodate a large motor, but tend to be top-heavy. Inline sanders are shaped like a shoebox and have the motor parallel to the belt. This design is less tippy, lighter in weight and generally easy to operate, but won't handle a large motor. It's much easier to set an inline sander upside-down on your bench for sanding small parts or sharpening, and the sanding frame, available as an option, makes sanding flat surfaces safer.

Most users prefer the transverse simply because for shop use horizontal surfaces are the norm, and the transverse models have more power. However, if you want portability, versatility and you plan to use the tool on do-it-yourself projects as well as in the shop, the inline is a good choice. Handle both types before you buy.

Amps, Power and Speed

Amperage is the best measure of how aggressive the sander will be (see chart, at right.) For panels, more amps equal faster sanding. In delicate sanding situations, like working on veneered material, variable speeds (or at least two speeds) allow you to slow the sander down for more control. It's a useful feature.

A Note on Weight

There's a huge range in weight among these tools: from 6 lbs. to 15 lbs. More than any other portable power tool, however, weight can actually be advantageous in a belt sander. Belt sanders are designed so that the weight of the sander does the work. You should not push down on them, or you will gouge your work and cause premature belt wear.

Again, choosing your sander comes down to how much your tool will be dedicated to horizontal surfaces in the shop (heavy is good) versus how much you anticipate using the tool for carpentry and cabinet installation (lighter is better).

Recommendations

We had three groups of woodworkers test 26 sanders. Our editors had a crack at them and then a panel of six amateur woodworkers of varying skill levels tried them out. Then we gave all of the sanders to a large cabinet shop for a few weeks to hear from the "power users."

In general, editors and testers liked a large number of these tools. Preferences were mainly for small and subjective things, like the position of the dust bag and the heft or the feel of the belt-changing lever. The most significant difference was noise: The Makita 9921 and 9403 were very quiet; the Porter Cable models were about the same as all the other sanders. However, no single tool stood out enough to warrant an Editor's Choice. One sander stood out as a Best Buy (right).

Durability is an important aspect of sanders, because they tend to run for long periods. However, it's almost impossible to measure. Our advice: Buy from a reputable dealer with good service and repair facilities. *AW*



AMERICAN WOODWORKER BEST BUY

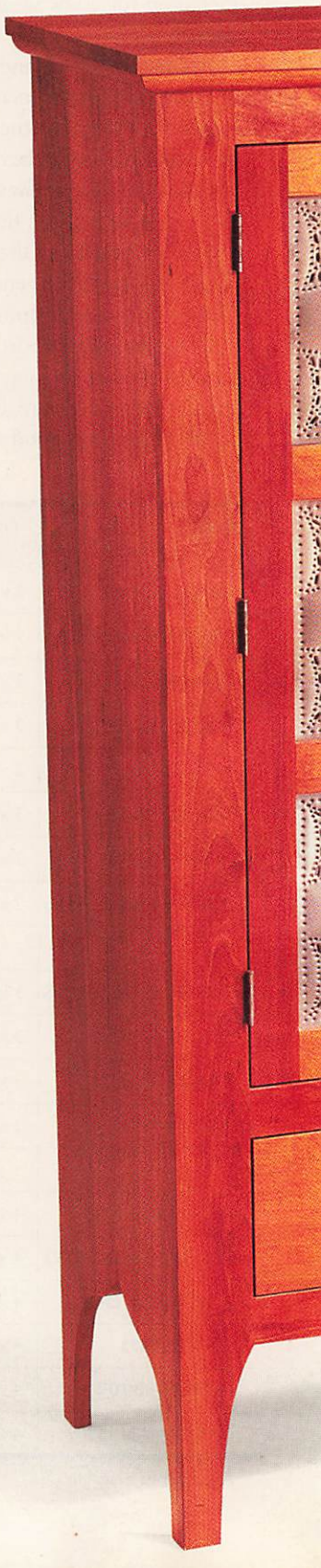
HITACHI SB 75 is an excellent 3 in. x 21 in. sander. It has the highest amp motor in the group, the dust bag works well and it has two speeds. It would be handier if the low end of the speed range were lower, but it works OK. A weak spot is the belt-change lever. It's pointy and hard to pull. Get the bench stand ($35) to really make this one versatile.

Brand	Belt Size	Price	Amps	FPM (feet per minute)	Dust Bag	Weight in lbs.	Comments
DeWALT DW431	3 x 21	$190	5.2	475-1100	Y	7	Very quiet. Easy to handle. Good dust bag location. Rear and front handle are a little too close together. (800) 4-DeWalt
CRAFTSMAN 27725	3 x 21	$130	6	775-1150	Y	7	Inline motor. Long cord. Dust bag stays out of your way. Noisy. (800) 377-7414
RYOBI BE321	3 x 21	$150	6	755-1148	Y	7	Inline motor. Easy to get at speed control. Dust bag stays out of your way. Noisy. (800) 525-2579
BOSCH 1274DVS	3 x 21	$185	6.6	550-1100	Y	7	Inline motor. Very comfortable and balanced. Dust bag stays out of your way. (877) 267-2499
MAKITA 9901	3 x 21	$170	6.7	1246	Y	6	Light and easy to use. Square port on dust bag requires special connector. (800) 462-5482
MAKITA 9900 B	3 x 21	$185	7.8	1180	Y	10	Extra-long cord. Square port on dust bag requires special connector. (800) 462-5482
HITACHI SB 75	3 x 21	$170	8.7	1180/1475	Y	10	Excellent value. Big motor. Good balance. (800) 546-1666
PORTER CABLE 352VS	3 x 21	$185	8	850-1300	Y	10	Solid, well-made sander. Good balance. Dust bag can be pivoted to any position. (888) 848-5175
PORTER CABLE 360VS	3 x 24	$250	12	1000-1500	Y	15	Well balanced. Big motor. Motor overhangs belt edge. Dust bag swivels to any location. (888) 848-5175
BOSCH 1275 DVS	3 x 24	$230	10.5	1150-1550	Y	12	Love the front handle. Great belt change lever. Motor overhangs belt edge. (877) 267-2499
MAKITA 9924 DB	3 x 24	$195	7.8	1300	Y	12	16-ft. cord. Square port on dust bag requires special connector. (800) 462-5482
MAKITA 9921	3 x 24	$230	11	500/1640	Y	12	Very quiet tool. 16-ft. cord. Motor projects past belt. (800) 462-5482
MILWAUKEE 5936	4 x 24	$295	10	1400	Y	12	Easy belt change. Good balance. (262) 781-3600
PORTER CABLE 362VS	4 x 24	$250	12	1000-1500	Y	14	Dust bag can be pivoted to any position. Heavy and aggressive tool. (888) 848-5175
BOSCH 1276 DVS	4 x 24	$245	10.5	1150-1550	Y	14	Pivoting d-handle on front. Good balance. Dust bag slightly in the way for right-handed users. (877) 267-2499
MAKITA 9403	4 x 24	$240	11	500/1640	Y	13	Very quiet tool. 16-ft. cord. Good dust collection. Can pivot dust bag. (800) 462-5482
HITACHI SB 10T	4 x 24	$240	8.7	1150/1380	Y	11	Light weight in a big sander. Motor is smallest in class. (800) 546-1666
CRAFTSMAN 11792	4 x 21	$105	7.5	1300	Y	9	Low price for a big platen. Light and easy to maneuver. Will need to shop a little to find belts. (800) 377-7414

Accessories available: F = Sanding frame S = Stand

Cherry Pie Safe

by Dave Munkittrick and Bruce Kieffer



This versatile classic goes together fast with biscuits.

Pie safes like this one were once commonplace. The pierced-tin panels kept insects out while providing ventilation for cooling baked goods.

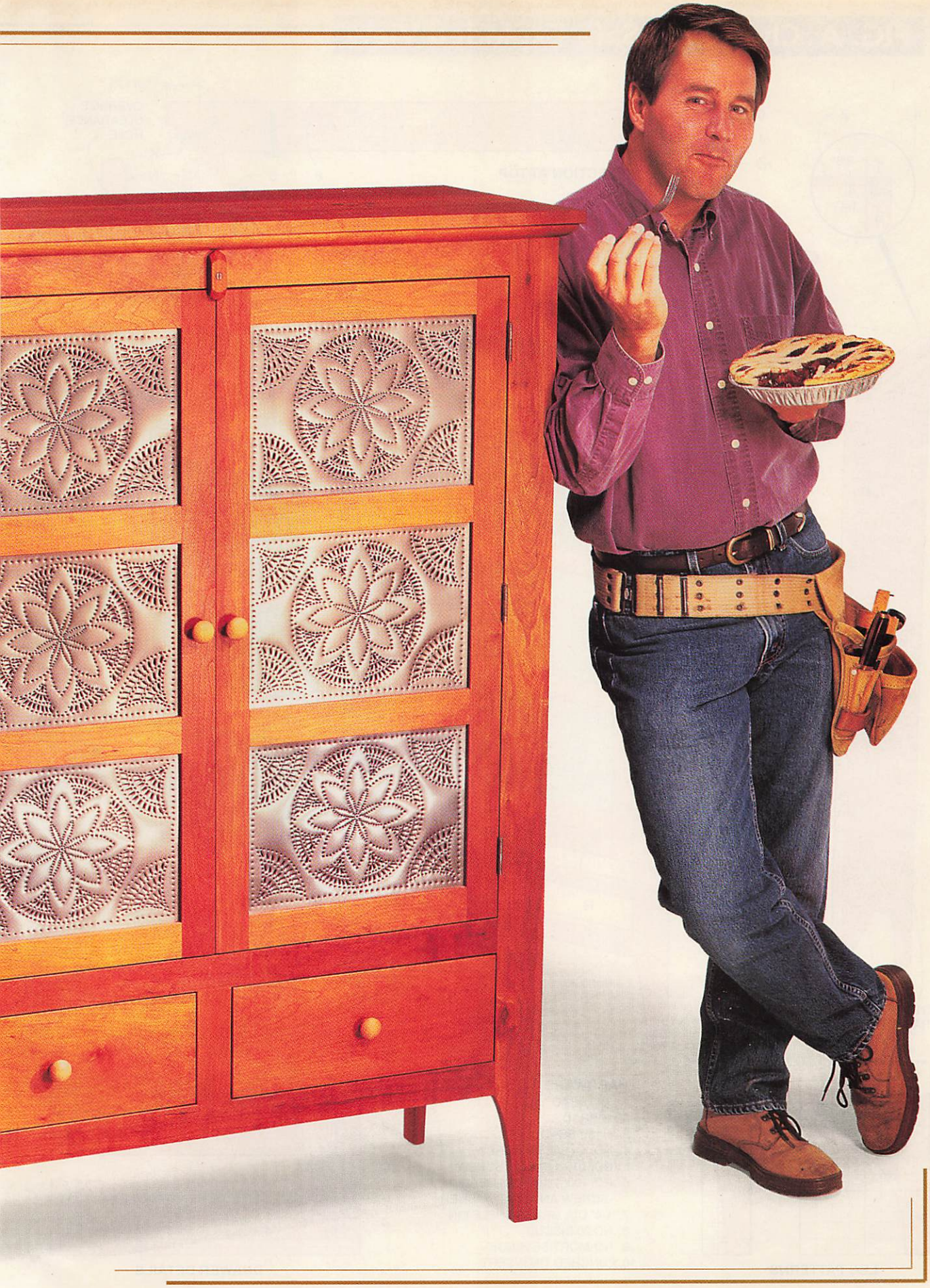
Our version is built of solid cherry with a simple, modified-Shaker style that blends easily into most any decor. Adjustable shelves and a pair of drawers make it a versatile storage cabinet. The pierced-tin panels that once cooled pies provide ventilation for a modern sound system. Or, you can use this pie safe to store clothing and take some of the pressure off that overstuffed closet or bureau.

Biscuits make the joinery on this project as easy as pie. If you've never made a project of this scale before, or are new to biscuit joinery, this is the perfect place to start. You'll need to know how to make stopped rabbets for the back and dadoes for the drawers, but hanging the flush-fit doors is a breeze with no-mortise hinges. (If you choose to mortise-in the hinges, check-out our how-to technique in "Flush-Fit Cabinet Doors" on p. 78.)

GETTING OFF TO A GOOD START

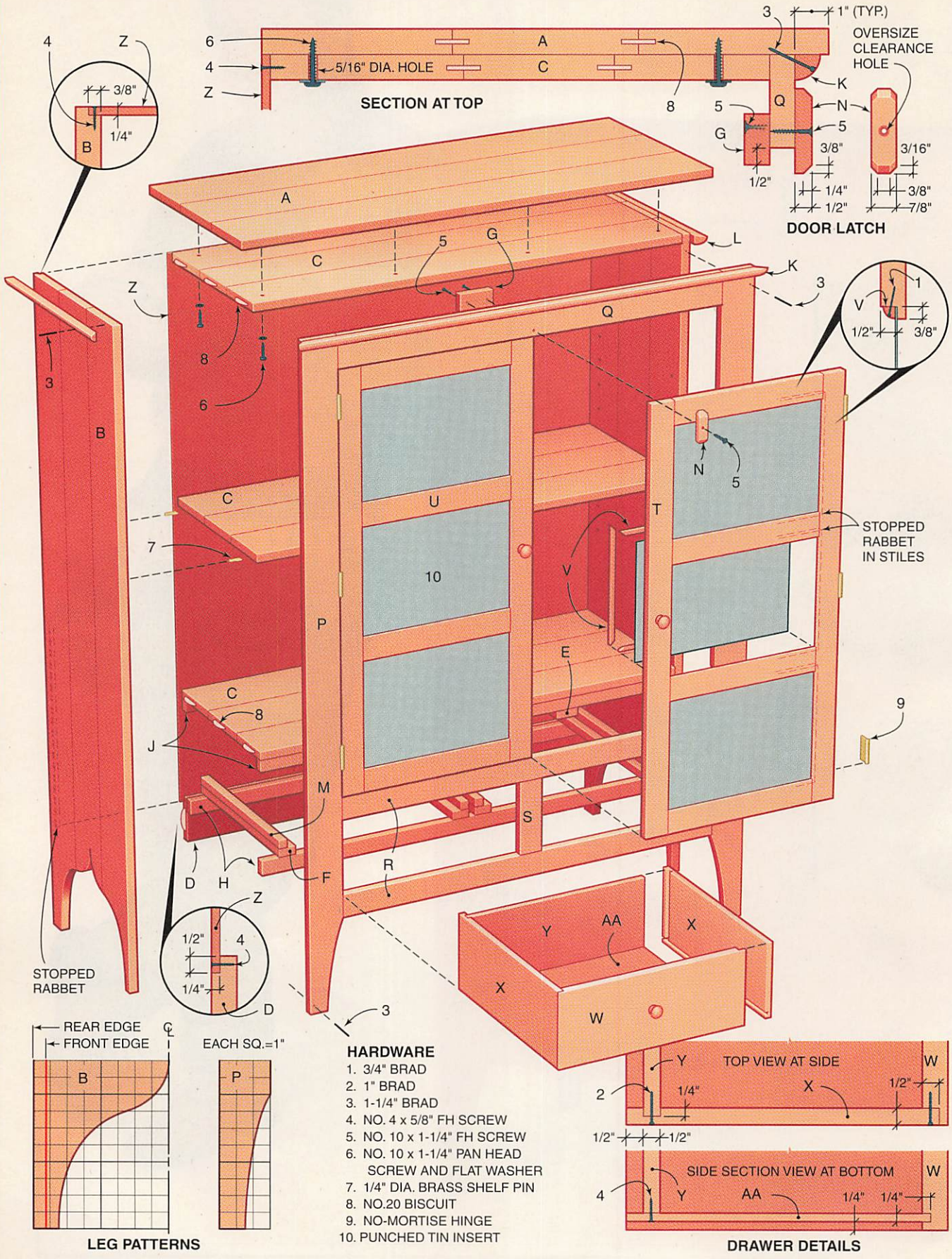
You'll need a biscuit joiner, a tablesaw set, a router with a 3/8-in. rabbeting bit and a jigsaw to complete this project. With the exception of the drawer bottoms and back, the whole cabinet is made of solid cherry. One of the tricks to using cherry is to be fussy about your lumber. The color of cherry can vary greatly (that's why it's often stained dark by manufacturers). Select boards with uniform color or ask that the wood you order come from a single tree.

We spent about $800 on this pie safe. You can shave off some of that cost, (as much as $180), by punching your own tin (see sidebar on p. 77). Now, let's head for the shop.



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FIG. A Cherry Pie Safe Exploded View

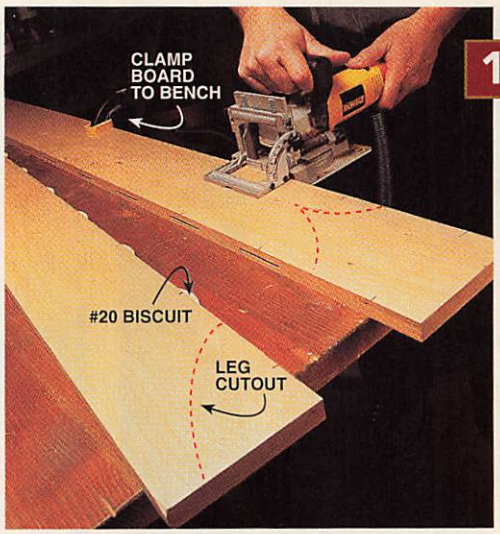


START WITH THE WOOD

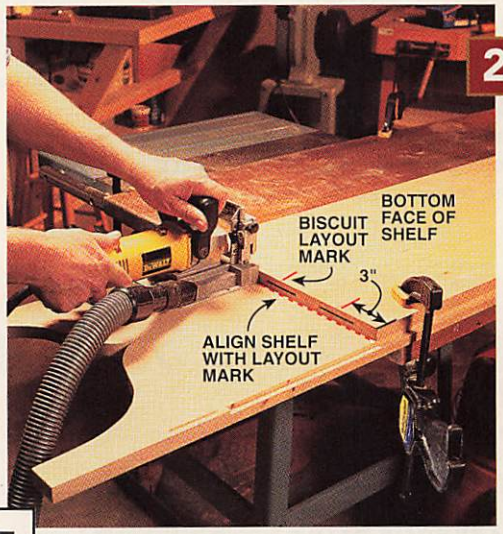
Sort your wood for grain and color. Most cherry boards have some sapwood, the off-white wood found on the outer edge of the trunk. Plan your cuts so the sapwood is kept to the inside where it won't show. Select flat, straight-grained wood for the doors and face frame. This is one place you can't afford any warping. Cut the drawer fronts (W) from a single board so the grain flows from one drawer to the next. Choose boards with compatible figure and color for the sides (B) and top (A). Use the less desirable pieces for shelving.

TIPS FOR BETTER BISCUITING

• There are three common sizes of biscuits: #20, #10 and #0. #20 biscuits offer the greatest gluing surface and are therefore the strongest. Use these whenever possible even if it results in the biscuit "breaking out" of the joint (Photo 8). Breakout occurs on the face frame and door frame where narrow rails join the stile. But that's not a problem if you offset the center mark for the biscuits so the breakout won't be seen. We did this on the face frame so the biscuits break out where the drawers and top cover them



1 CUT THE BISCUIT SLOTS about 6-in. apart for edge joining. The biscuits align the surface of the boards producing flush joints that require little sanding. You don't want to expose a biscuit joint when making your final cuts so keep your biscuits at least 3-in. away from the ends of the top (A) and the leg cutout area on the sides (B).

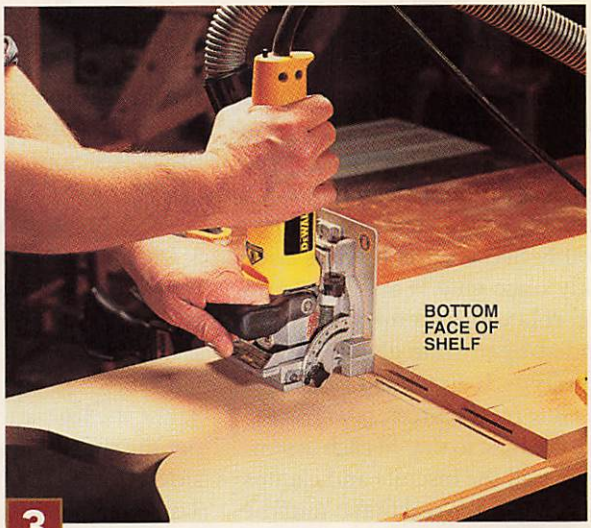


2 CUT THE SLOTS in the end of the shelf with the base of the plate joiner on the cabinet side. Clamp the shelf on the side so the top edge of the shelf lines up with the top edge of the layout mark on the side. Mark for biscuits in the middle of the shelf and 3-in. in from each end.

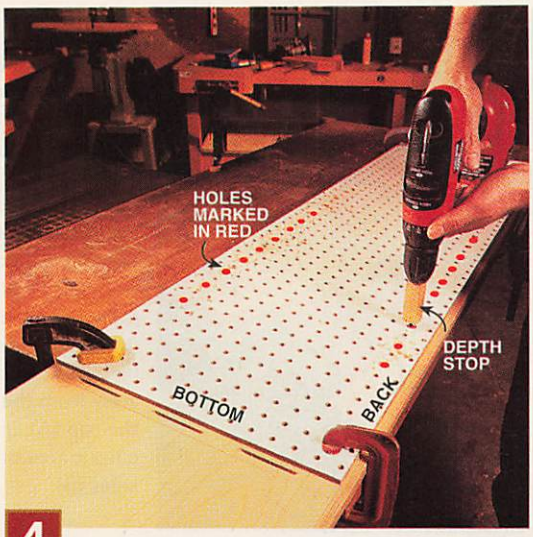
Oops!



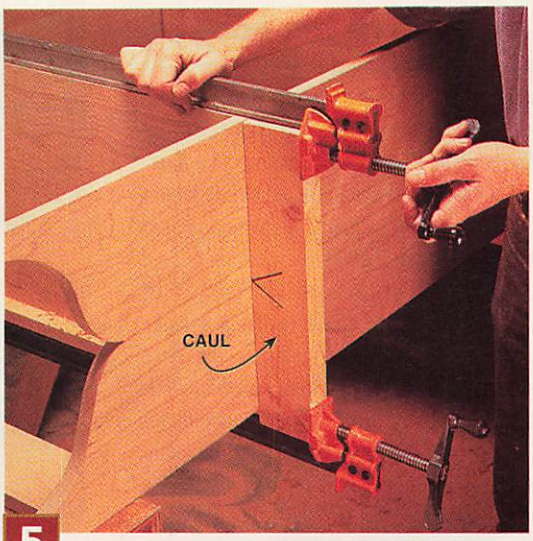
Somehow we managed to cut a biscuit where none belonged. A careless pencil mark can be mistaken for a biscuit mark when you're cutting your way through a pile of frame members. Here's how we fixed it: Use a compass to mark a 4-in. dia. circle in some 5/32-in.-thick cherry and cut it out on the bandsaw. Glue the circle into the bad slot and clean up any excess glue. After the glue dries, flush-cut the repair.



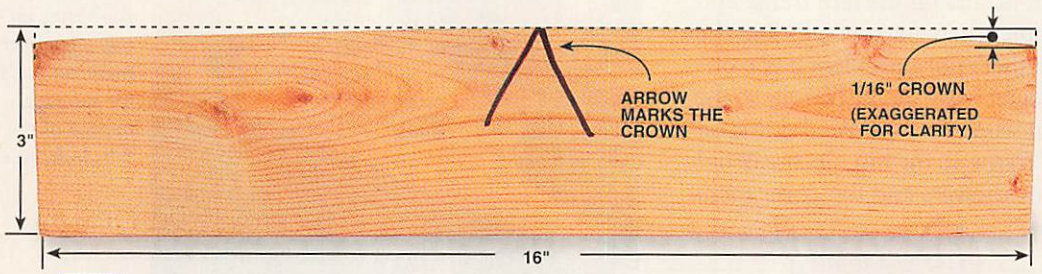
3 CUT THE SLOTS in the side with the plate joiner held vertical and using the markings on the shelf.



4 DRILL FOR ADJUSTABLE SHELF PINS using a perf-board template. Mark the bottom and back edge to correctly register the template on the other side of the cabinet. Mark the holes to be drilled (every other hole gives a 2-in. spacing) and use a sharp brad-point bit. Make your own foolproof depth stop from 3/4-in. x 3/4-in. stock that's drilled down the center and cut to length.



5 CLAMP THE CARCASS ASSEMBLY using shop-made cauls to distribute clamping pressure across a wide joint. See Photo 6 for how to make cauls.



6 MAKE YOUR CAULS from 2x4s cut to the width of the cabinet. Make sure they are well dried and all four sides are square. Plane or sand a 1/16-in. crown on each caul and mark the crown with an arrow. While you're at it, make some extras and keep them for future use.

(Fig. B). Breakouts on the door frames are covered by the tin panel stops. We offset the top-rail biscuits to keep the top edge of the door clean (Fig. C).

• Assembly with biscuits needs to go smoothly because the biscuits swell quickly once glue is applied. For a more relaxed assembly, use an extended-open-time glue like Titebond's Type II Extended or Liquid Hide Glue (see Sources, p. 77).

• Take the time to dry-fit each assembly using all the biscuits and clamps you'll need for the real thing. You'll be able to rehearse your glue up and red flag any misaligned biscuits.

• Getting glue in the biscuit slots can be a bit messy. Just squirt a bead into the groove and spread it along both side walls of the slot with a small glue brush (see Sources, p. 77).

THE CARCASS

1. Lay out and cut the biscuit slots for the top (A), sides (B) and shelves (C) (Photo 1).
2. Dry-fit first then glue up and cut to length.
3. Use the leg patterns (Fig. A) to lay out the shapes on the bottoms of the sides. Cut them out with a jigsaw.
4. Use a tablesaw to cut the rabbet on the back rail (D) for the back (Z). Use a router with a 3/8-in. rabbeting bit to cut the stop rabbet on the sides for the back.
5. Lay out the fixed shelf locations on the cabinet sides, then cut the biscuit slots for the shelves and the back rail (Photos 2 and 3).
6. Drill holes for adjustable shelf pins (see Sources, p. 77; Photo 4).
7. Finish-sand all the pieces starting with 120-grit and working your way to 320-grit for an oil finish. If you plan to varnish, stop at 220-grit.
8. Dry-fit and glue the carcass using four clamps and cauls for the shelves (Photo 5) and a fifth clamp for the back rail. Be sure the carcass is glued up square.
9. Glue the drawer kicker cleats (J) to the bottom of the lower shelf. If you own a pneumatic brad nailer,



7 **CUT SLOTS IN THE ENDS** of narrow parts, like this face frame rail, using a simple jig to steady the work and provide a wider surface for the plate joiner fence. We used a 12-in. x 30-in. piece of melamine with a 3-in. x 18-in. piece of hardwood centered along the edge. Add a couple of hold-down clamps (see Sources, p. 77). Note how the cabinetmaker's triangle identifies the piece being cut as the top rail.

The Cabinetmaker's Triangle

Labeling your project parts with letters and numbers works fine when you're dealing with a few pieces. But if your pile of parts gets mixed up it can take a while to sort things out again. The cabinetmaker's triangle allows you to instantly identify the location and orientation of each individual piece. Here's how it works: Group your frame members face-side up in the same orientation they will have when assembled (stiles are vertical, rails are horizontal, etc.) Mark each group with a triangle that points up towards the top of the cabinet. (With parts like the top and shelves, the triangle will point to the back of the cabinet). The triangle leaves two lines on each piece making identification a snap (See Figs. B and C). If two or more assemblies are identical, like our pair of doors, add an extra line along the triangle's side for the rails and along the bottom for the stiles.

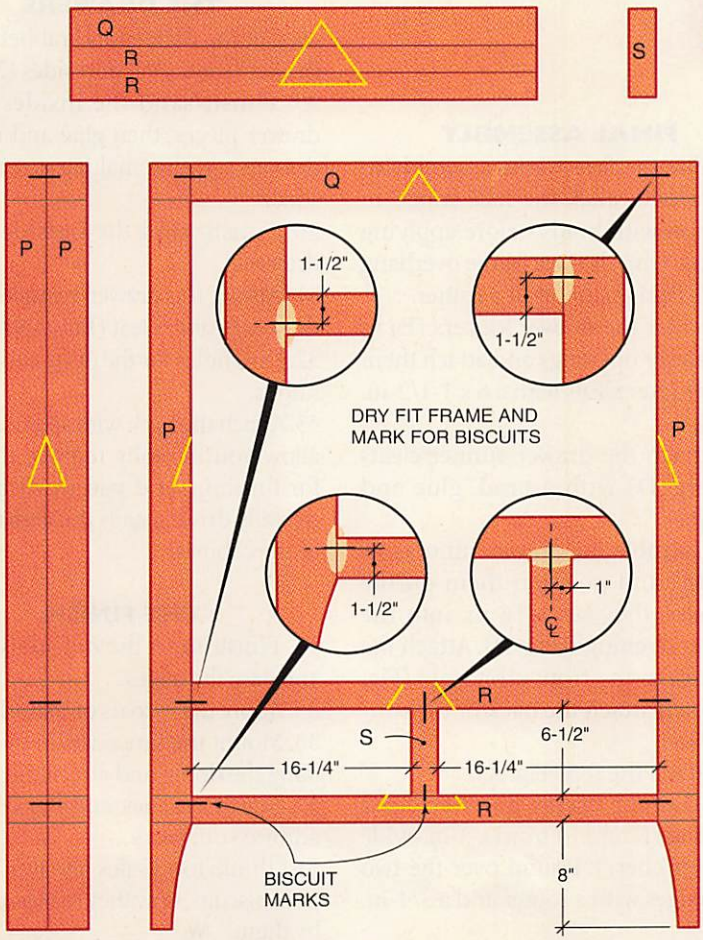
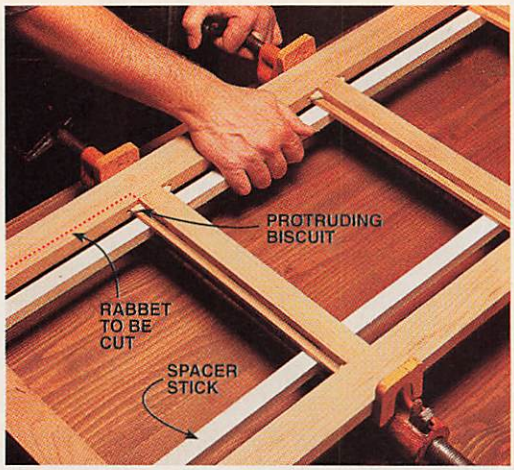


FIG. B Face Frame Layout

Group the stiles and rails together and orient them as they will be on the cabinet. Use a square to mark the precise position of each rail on the stiles. Make these lines light and long to distinguish them from your biscuit marks. Now, decide where an offset is needed to disguise any biscuit breakout. To figure out how much to offset the bottom rail, for example, subtract the width of the rail (2 in.) from the width of the slot made by the joiner (2-3/4 in.). If you centered the biscuit on the rail, the slot would breakout 3/8 in. on each side. To keep the biscuit inside the drawer opening, you'll need to offset the cut 3/8 in. towards the opening. Add 1/8 in. for insurance and you have an offset of 1/2 in.



8 ASSEMBLE YOUR DOOR FRAMES on a perfectly flat surface using identical clamps. This helps ensure a flat door and saves all kinds of headaches later. Spacer sticks hold the frame up off the clamps (so it won't get stained) and in line with the clamp screw pressure (so it won't get twisted). Note how the biscuits protrude into the panel rabbets. They'll be removed later when the rabbets are completed with a router.



9 MARK THE POSITION OF THE DRAWER RUNNERS on the lower back support cleat. Have the drawer in place with even margins around the opening and enough room between the slides and drawer sides for smooth operation. Remove the drawer and fasten the runners with screws.

tack the cleat in place first so it won't slide around when you apply the clamps. (Brad nailers can be like a third hand during assembly. See "Brad Nailers," p. 43, for more information.)

THE FACE FRAME

10. Lay out the face frame, as shown in Fig. B.
11. Cut the biscuit slots (Photo 7) and dry fit the face frame.
12. If you are mortising in your hinges, now's the time to lay out and cut the hinge mortises on the inside edges of the face stiles.
13. Lay out and cut the leg profiles on the bottom of each stile (Fig. A).
14. Begin the glue up with the drawer divider mullion (S) and the lower rails (R). Then glue the rest of the face frame together.
15. Trim the protruding biscuits and finish sand.

FINAL ASSEMBLY

16. Glue the face frame assembly to the carcass. Tack the face frame in position with brads before applying clamps. Trim the face frame overhang with a flush-trim bit in a router.
17. Center the drawer kickers (E) in the drawer openings and attach them to the kicker cleats with a 6 x 1-1/2-in. screw.
18. Attach the drawer runner cleats (H, Fig. D) with a brad, glue and clamps.
19. Assemble the drawer runners (F and M) and position them on the cleats so they set 1/16 in. into the drawer openings (Fig. D). Attach the runners to the front cleat only (Fig. D). You'll attach the back of the runners later.
20. Attach the top (Fig. A).
21. Make the cherry quarter-round molding (K and L) from a 3-in.-wide piece of cherry. Round over the two long edges with a router and a 3/4-in. round-over bit. Rip the moldings off the piece and cut to fit. Glue and nail the front molding in place. Nail the side moldings in place but only glue the miter joint and the first couple of inches at the front of the case. This will keep the miter joint tight but still allow the carcass to move with the seasons.

THE DOORS

22. Use a tablesaw to cut the rabbets on the back edges of the door rails (U).
23. Cut biscuit slots, dry-fit, glue and clamp the door frames (Photo 8).
24. Finish the rabbets on the doors with a router and a 3/8-in. rabbeting bit—this will also trim the protruding biscuits. Square the corners with a sharp chisel.
25. To fit the doors see "Flush-Fit Cabinet Doors" on p. 78.
26. Make the door latch (N) and mount it and the door stop (G, Fig. A.)
27. Make the tin panel stops (V) and miter to fit in place, but don't attach them yet.

THE DRAWERS

28. Cut the dadoes and rabbets in the drawer fronts (W) and sides (X).
29. Finish-sand the insides of the drawer pieces, then glue and nail the drawers together making sure they are square.
30. Finish-sand the outside of the drawers.
31. Attach the drawer runners to the drawer runner cleat (Photo 9).
32. Drill holes for the door and drawer knobs.
33. Attach the back with screws. Screws allow you to easily remove the back for finishing and you won't be accidentally driving nails through the side of the cabinet.

THE FINISH

34. Finish-sand the outside surfaces and ease the edges.
35. Apply three coats of Danish oil.
36. Mount the tin panels in the doors, hang the doors and attach the knobs.
37. Attach the back and stand back to admire your work.

Just think; food safes like this used to hold biscuits; now they're held together by them! *AW*

FIG. C Door Frame Layout

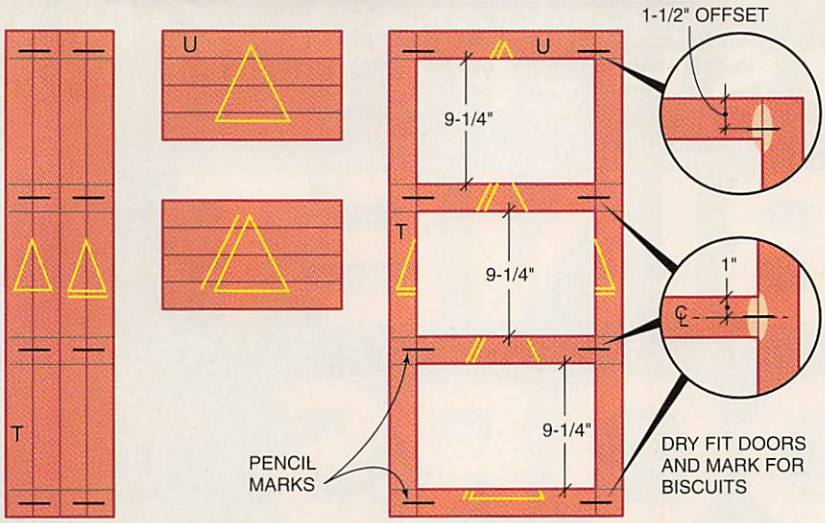
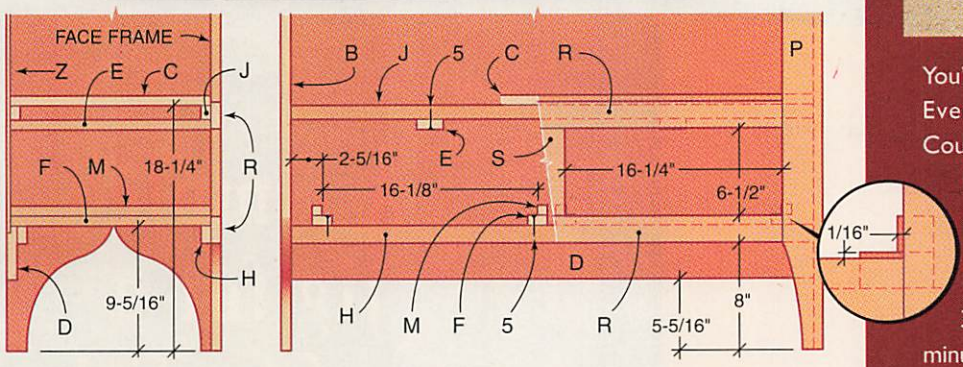


FIG. D Interior Construction



CUTTING LIST

PIE SAFE 57-3/4" H x 42-1/2" W x 16" D

Part	Name	Qty.	Dimensions
CARCASS Cherry Hardwood			
A	top	1	3/4 x 17 x 42-1/2
B	sides	2	3/4 x 15-1/4 x 57
C	shelves	5	3/4 x 15 x 39
D	back rail	1	3/4 x 4 x 39
E	drawer kickers	2	3/4 x 2 x 15
F	drawer runners	4	3/4 x 1-1/2 x 15
G	doorstop	1	3/4 x 1-1/2 x 3
H	drawer runner cleats	2	3/4 x 1-5/16 x 39
J	drawer kicker cleats	2	3/4 x 1-1/16 x 39
K	molding	1	3/4 x 3/4 x 42
L	molding	2	3/4 x 3/4 x 16-3/4
M	drawer runners	4	3/4 x 3/4 x 15
N	door latch	1	1/2 x 7/8 x 2-1/2
FACE FRAME Cherry Hardwood			
P	face stiles	2	3/4 x 3 x 57
Q	top rail	1	3/4 x 2-3/4 x 34-1/2
R	lower rails	2	3/4 x 2 x 34-1/2
S	drawer divider mullion	1	3/4 x 2 x 6-1/2
DOORS Cherry Hardwood			
T	door stiles	4	3/4 x 2 x 35-3/4
U	door rails	8	3/4 x 2 x 13-1/4
V	tin panel stops	24	3/8 x 3/8 x 15
DRAWERS Cherry Hardwood			
W	drawer fronts	2	3/4 x 6-3/8 x 16-1/8
X	drawer sides	4	1/2 x 6-3/8 x 15-1/2
Y	drawer backs	2	1/2 x 5-7/8 x 15-5/8
CHERRY PLYWOOD			
Z	back	1	1/4 x 39-3/4 x 48-3/16
AA	drawer bottoms	2	1/4 x 14-3/4 x 15-5/8

SOURCES

4/4 Cherry, 100 bd. ft.
1/4" x 4' x 8' cherry plywood; 1 sheet
Paxton Hardwoods, (800) 522-3305.

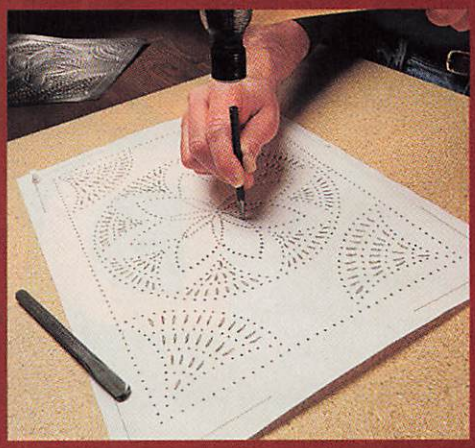
Titebond II Extended, 1 gal., #16.50.20, $26
Titebond Liquid Hide Glue, 1 quart, #16.50.01, $7.50
Small glue brush, #16.60.25, $2.50 for10; $10 for 50
Hold-down clamps, #16.60.05, $12 each
Highland Hardware, (800) 241-6748

Sixteen 1/4"-dia. brass shelf supports, #27111; $2.50
Three pewter no-mortise ball hinges, #130191, $2.75 each
Woodcraft Supply, (800) 225-1153

Four 1/4" dia. wood knobs, AF-S969C, $1.20 each
Van Dyke's, (800) 558-1234

Six pierced-tin panels "Lacework #1" 10-in. x 14-in., $30.95 each, Country Accents, (570) 478-4127.

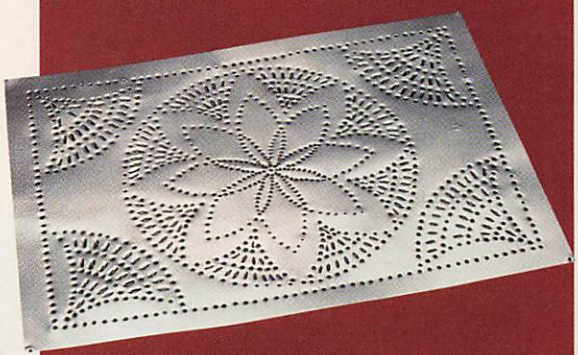
Punch your own Tin!



You'll save money and have fun doing it. Everything you need is available at Country Accents (see Sources, at left): 10-in. x 14-in. tin blanks ($3.50 each); the pattern (Lacework #1, #1004P, $2); the hole punch (T-0359, $4.95); and the lampmaker's chisel (T-0259-3/8, $7.25). Expect to spend 30 to 40 minutes punching each panel. Don't try to do all six in a row or you'll feel like punching more than tin. Take it easy and spread the job over a few days.



Wear a pair of gloves when handling the tin to keep from etching in fingerprints. Tape the pattern to the tin with masking tape. Use pushpins to hold the work down on a piece of particleboard and have at it. Complete instructions come with every order.



by Andy Rae

FLUSH-FIT CABINET DOORS



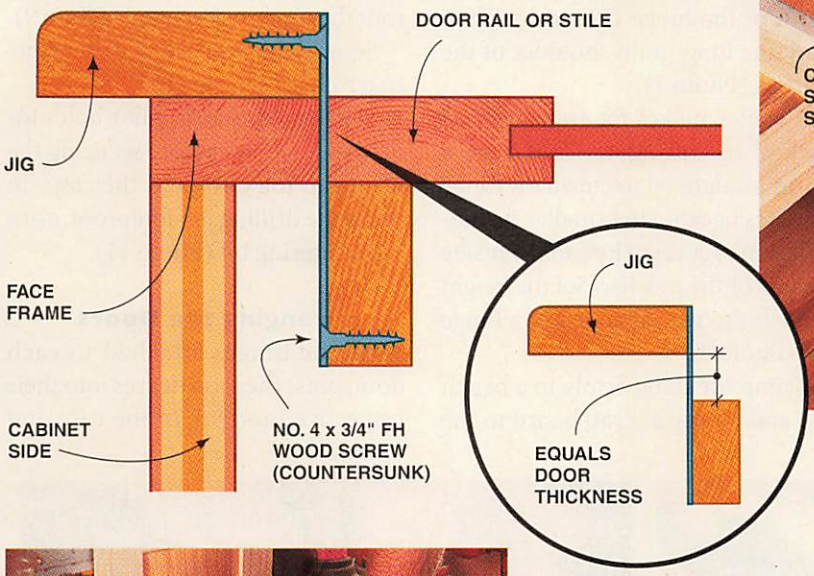
A simple jig for a perfect fit!

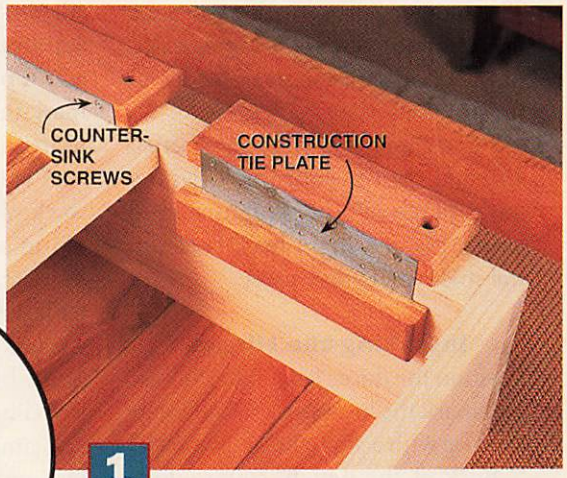
Flush-fit or inset doors are found in a wide variety of furniture styles from Philadelphia highboys, to Shaker cupboards, to sleek contemporary pieces. The greatest challenge in hanging a flush-fit door is achieving an even gap between the doors and the cabinet while accurately locating the mortises for the hinges. After all, there are no adjustment screws on butt hinges and there's no door lip to cover the cabinet opening.

The good news is that a few savvy techniques and a nifty jig (Photo 1) will have you hanging these doors like a pro. In this article, I'll show you how to achieve the perfect fit every time. We'll even cover fixing goof-ups.

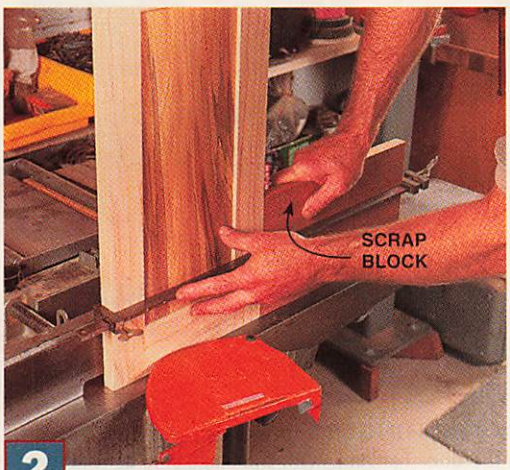
EDITOR: DAVE MUNKITTRICK • ART DIRECTION: JOEL SPIES AND BARBARA PEDERSON • PHOTOGRAPHY: ANDY RAE • ILLUSTRATION: EUGENE THOMPSON

FIG. A DOOR HANGER JIG

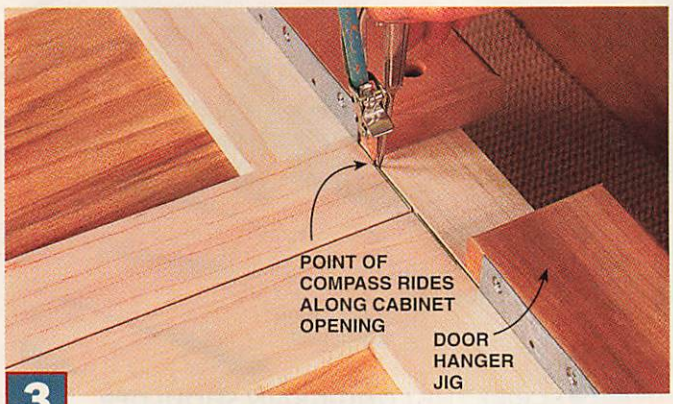




1 **SHOP-MADE DOOR HANGERS** hold the doors in place so you can scribe for a perfect fit. They're constructed from two blocks of hardwood and a metal tie plate. Tie plates are used to join house framing and are available from home centers.



2 **FIRST, TRIM THE EDGES** on the jointer. Set the infeed table for a light cut (1/32 in. or less), and joint all four edges. A scrap block steadies the door and prevents end-grain tearout.



3 **POSITION THE DOORS** on hangers and check the fit of the doors to the case. The hangers hold the doors flush with the cabinet face and establish a 1/6-in. gap. Set the compass to the largest gap, then mark around the doors with the compass.

Fit the Cabinet Hinges First

First things first. Whether you're making a cabinet with a face frame or one without, cut the mortises for the hinge leaves in the frame or case sides before assembly. This saves hassles later when rails or cabinet tops can get in the way. I use the same technique for mortising the case as I do for the doors.

Make the Doors

I always dimension my doors so they are the exact size of my case opening. This approach lets me fine-tune the fit of the doors to the cabinet once it's built.

Flat and square doors prevent untold headaches later. Be sure to work on a flat surface when you glue up your doors, and center the clamping pressure over the joints. Before the glue sets, check each door for square by measuring its diagonals.

Trim the Door to Fit the Case

At first the doors won't fit into the case opening because there's no gap. That's OK. This two-step trimming procedure allows you to get the perfect fit:

The first step is to joint all four edges of each door (Photo 2). Periodically check the fit, and joint until you have a gap of roughly 1/16 in. all around between the door and the case.

The second step is to fine-tune the fit of the doors to the case. Position each door into the case on a pair of shop-made hangers (Photo 1 and Fig. A).

Chances are, your doors won't fit the opening with precise, even gaps all around. To make the gaps perfect, use a

compass to mark the doors (Photo 3). The hangers prevent the compass from scribing across the entire width of the door, so use a straightedge to finish.

Next, clamp the door in a bench vise and trim to your marks with a hand plane (Photo 4). For paired doors, plane a slight back bevel on the stiles where they meet.

Installing the Hinges

Position the doors back into the case and mark the locations of each hinge mortise with a sharp knife (Photo 5.)

Back at the bench, square your knife marks across the edge of the stile with a square and a sharp pencil. Set a marking gauge to the desired width of the hinge (Photo 6). Then mark the long-grain shoulder of the mortise (Photo 7).

A router makes for fast, accurate work when cutting mortises. I use a 1/4-in. straight bit to cut all my hinge mortises because the smaller diameter lets me get very close to the inside corners of the mortise. Set the height of the bit to the thickness of a hinge leaf (Photo 8).

Clamp the door firmly in a bench vise and secure a scrap board to the benchtop. The scrap board's surface must be flush with the edge of the door to support the router base. Now rout the mortise freehand (Photo 9).

Square the mortise with a razor-sharp chisel (Photo 10).

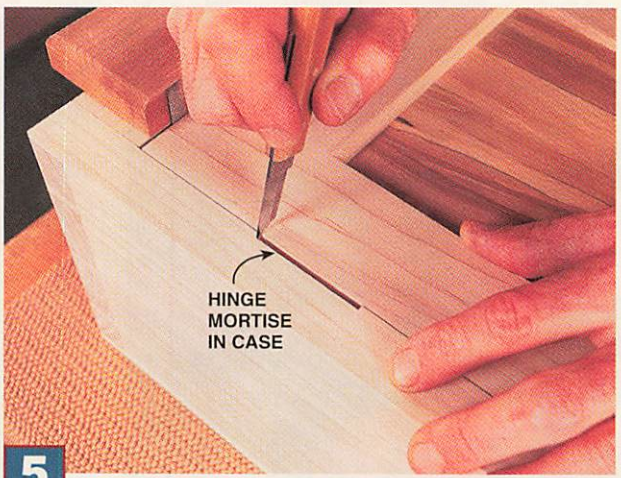
You'll need to drill pilot holes for the hinge screws before securing the hinges to the door and the case. To make the drilling job foolproof, use a self-centering bit (Photo 11).

Hanging the Doors

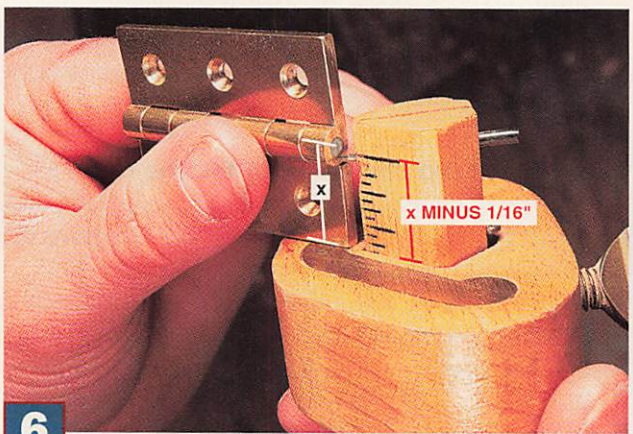
With the hinges attached to each door, press the loose leaves into their respective mortises in the case and



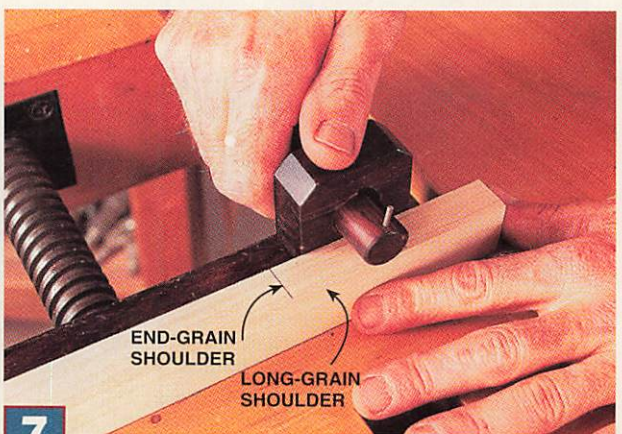
4 **PLANE THE EDGES** to your compass marks to true the doors. Use a sharp bench plane set for a light cut. Maintain a square edge by checking your cuts with a square.



5 **MARK FOR HINGES** by positioning the door into the opening with the door hangers. With the hinge stile tight against the case, transfer the shoulder locations of each hinge mortise with a sharp marking knife.



6 **HOW DEEP** should you install butt hinges into a door and case? The rule of thumb is to measure from the center point of the hinge barrel to the outside edge of one leaf, then subtract about 1/16 in. This layout ensures that the door won't bind on the face of the cabinet when opened.



7 **SCRIBE THE LONG-GRAIN SHOULDER** with the marking gauge to finish the hinge mortise layout.

install the screws. Now open and close the doors and inspect the fit. Your doors should swing as smooth as silk, with the doors flush to the face of the cabinet, and even gaps all around. If you notice some unevenness, a little judicious sanding with some 180-grit sandpaper wrapped around a block can usually fix the problem. Once you're satisfied with the fit, mark the doors for knobs or pulls and install these along with your favorite catch hardware. Case closed. AW

Oops!



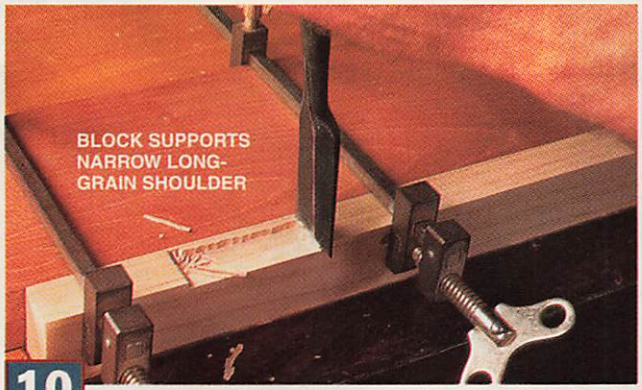
Uh-oh! We accidentally trimmed too much off one edge of a door. Luckily, it was a long-grain edge and there's a simple fix. Re-joint the edge, then glue on a thin strip to increase the door's width. The strip should match the stile in grain and color and be slightly oversize in width and length. Trim it to fit after the glue dries. You'll never see the fix!



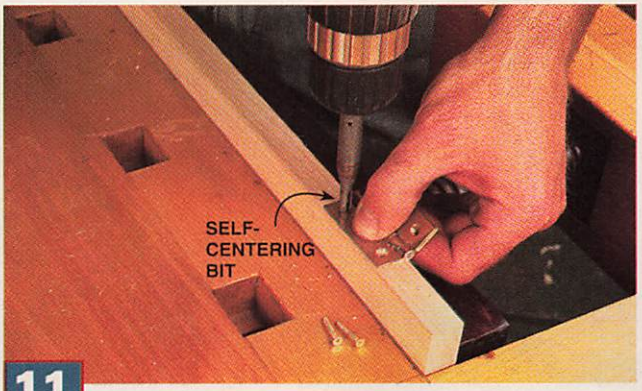
8 **SET THE BIT DEPTH** by laying a hinge leaf on the router's baseplate. Route a test mortise on a piece of scrap and check for fit. The hinge leaf should be flush with the top of the mortise. A 1/4-in. straight-tip bit is a good choice for routing the mortise.



9 **ROUT THE HINGE MORTISE** freehand, staying about 1/16 in. inside your layout lines. For a really clean cut, move the router in the opposite direction that you would normally rout: a technique called climb cutting. Routing in this manner prevents tearout, and it's easy to control the router because the cut isn't very deep and the bit diameter is relatively small. A scrap block clamped to the bench steadies the router's baseplate.



10 **SHAVE THE SHOULDERS** by chopping lightly with a sharp chisel. It's best to sneak up on your layout line, making several thin cuts until you reach the end-grain shoulder line. Clamp a block behind the long-grain shoulder to support this delicate area and take multiple cuts until you reach the shoulder line. Finish up by paring into the corners to clean up any left-over slivers of wood.

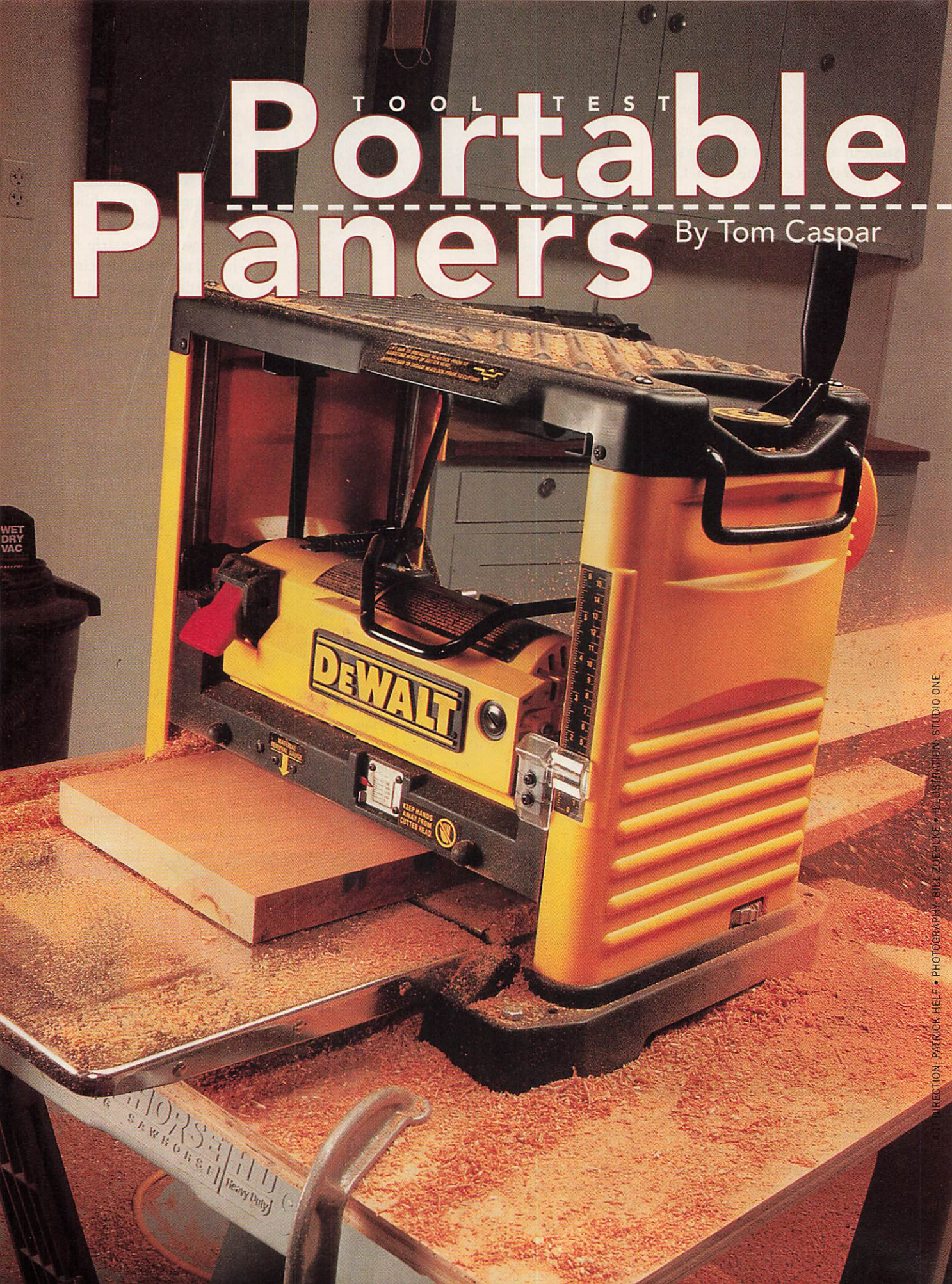


11 **DRILL FOR HINGE SCREWS** using a self-centering drill bit. Lay each hinge in its mortise and drill through the hinge and into the door. Rub a little wax onto the screw threads to lubricate them before driving the screws home. **Tip: Brass screws break easily! Use the same size steel screws first and install the brass screws after fitting and finishing are complete.**

TOOL TEST

Portable Planers

By Tom Caspar



ART DIRECTION, PATRICK HELF • PHOTOGRAPHY, BILL ZUCHTRIEGEL • ILLUSTRATION, STUDIO ONE



Gettin' better all the time.

A planer is a basic tool if you work with solid wood. Until recently, planers were large cumbersome machines that cost an arm and a leg. No more. Portable planers have changed all that for anyone with a small shop. You can tuck these relatively inexpensive machines away in a cubbyhole. If you use supports, they can handle almost any size board. The latest generation of portable planers are amazing machines.

Portable planer design is still evolving. The first machine on the market was the two-post Ryobi AP-10, a small capacity, lightweight machine introduced in 1987. Delta produced the first four-post machine, the 22-540, in 1991 and the first portable planer with a head lock, the 22-560, in 1997. Four posts are now standard on all models. Three machines now have head locks, but each mechanism is different.

The move to four posts and the introduction of a head lock is a response to the principal problem with portable planers: snipe—that bite out of the end of a board.

Snipe and Head Locks

All the planers we tested produced an incredibly smooth surface. They all work on the same principle: Two powered rollers feed a board through the planer while a cutterhead, equipped with a pair of knives, rotates at a very high speed.

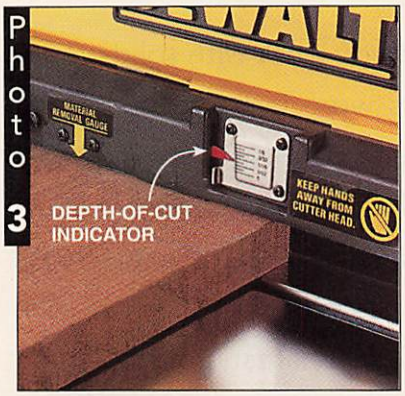
However, the smooth surface often begins or ends in snipe. The depth of snipe can be anywhere from the thickness of tissue paper to the thickness of a manila folder. (See p. 85 for more on where snipe comes from and how to deal with it). We wanted to know: Considering recent innovations in design, do all portable planers snipe?

The short answer is yes, they all snipe. But some snipe less than others. Planers with traveling heads and head locks really do snipe less often and less

A HEAD LOCK minimizes the amount of snipe but won't eliminate it. The Delta 22-560 head lock shown here is easy to use.

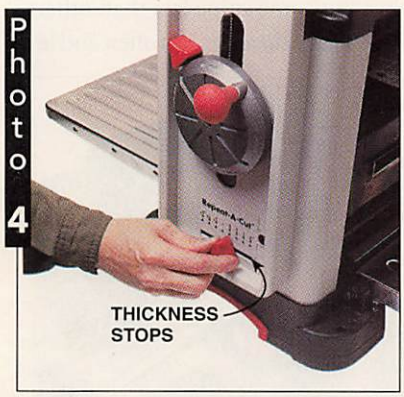


INDEXED DISPOSABLE KNIVES make it easy to get off to a fresh start. They drop right in place.



A DEPTH-OF-CUT INDICATOR tells you how much wood you're going to take off in each pass. This is very helpful, especially the first time through. This indicator, on the DeWalt DW733, is foolproof and easy to read.

All the planers produced an incredibly smooth surface, but they all snipe, too.



PRE-SET DEPTH STOPS can prevent you from making a big mistake. In the heat of production it's easy to misread a machine's scale and end up with boards that are too thin. Shown here is the Ridgid TP1300, which has more stops than other machines.

deeply than similar machines without head locks.

A head lock is designed to reduce the amount of snipe by locking the cutterhead assembly in place (Photo 1). It works this way—you turn a crank handle to set the depth of cut, push down the head lock lever and then run your boards through the machine. When you want to make another pass, you must reverse the head lock lever before turning the crank that sets the depth of cut. Crank, lock, plane, unlock, crank. It's a little dance you have to get used to.

Snipe-Free Machines, But at a Price

Two planers with fixed heads and long, solid tables stand out from the crowd. The good news is they rarely sniped boards less than 5-ft. long. The bad news is that they're expensive and take up more storage space because they don't have fold-up tables. They're also awkward to use with long boards. Support stands must be raised and lowered along with the table.

The Knives

The type of knives in a portable planer is not yet standardized. You have two choices. Some planers use single-edged knives that can be re-sharpened. Others use double-edged knives that can be reversed when one edge gets dull. The single-edged knives and some of the double-edged knives can be resharpened and used over and over again, while other double-edged knives are disposable. Both types cost about the same in the long run. A new set of disposable double-edged knives runs about $30 to $40, roughly as much as sharpening a set of single-edged knives twice.

Some knives are easier to install than others. We like the machines that have indexed knives (Photo 2). They click right in place. The other machines use gauges to set the knives. They work quite well and are only slightly less convenient than indexing pins. We also like the planers whose cutterhead locking bolts sit above the knives and are easy to get to.

Depth-of-Cut Indicator and Depth Stops

We like two features that make several portable planers more foolproof. We all know that an error in planing can be quite costly and frustrating.

The first feature is a simple depth-of-cut indicator that tells how much wood the planer will remove from your board (Photo 3). This is important to know because you can mistakenly set a portable planer to take a cut that it can't reasonably handle. All portable planer motors draw about 15 amps, so they all deliver about the same amount of power. This isn't enough power to hog off deep bites in wide boards. It's possible to overload the motor or pop a breaker if you're not careful. Before you run a board through the planer for the first pass, stick its end under this indicator and you'll know for sure how much wood you'll be removing.

Secondly, we like a set of depth stops that allow you to pre-set the final thickness of your board (Photo 4). With this feature, you can't accidentally plane your boards too thin, a disaster that has befallen just about everybody who has ever used a planer.

Capacity, Weight and Size

All the portable planers handle boards up to 12-in. wide. Some manage 12-1/2-in. boards and the Ridgid TP1300 has a 13-in. capacity.

The cutterheads of all the planers can travel up and down about 6 in. While you're not likely to find 6-in.-thick wood to plane, you will find this large capacity handy for planing the edges of boards. You can stand 3/4-in. or thicker boards on their sides and plane them all to exactly the same

(text continued on p. 86)

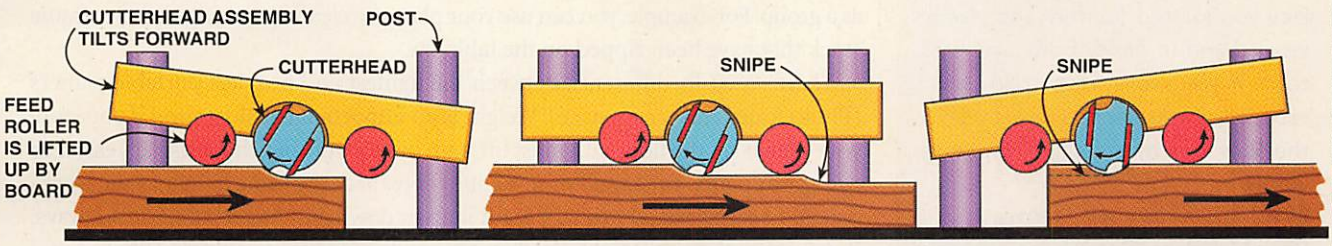
Dealing with Snipe



Snipe is a bite taken out of the end of a board. (A particularly bad case is shown here.) The length of the snipe is always about 2 in.—the distance from a feed roller to the center of the cutterhead. Portable planers may snipe the front or the rear of a board, but never in the middle.

Fig. A The Source of Snipe from a Portable Planer

The cutterhead assembly rides up and down on four posts in most portable planers. The assembly can tilt forward or backward because there is a small amount of play between it and the posts. When the assembly tilts, it cuts slightly deeper than normal, and you get a sniped board. The purpose of a head lock is to minimize this tilting.



Snipe at the front of a board is produced by the forward tilt of the cutterhead assembly. *The tilt shown here is greatly exaggerated.*

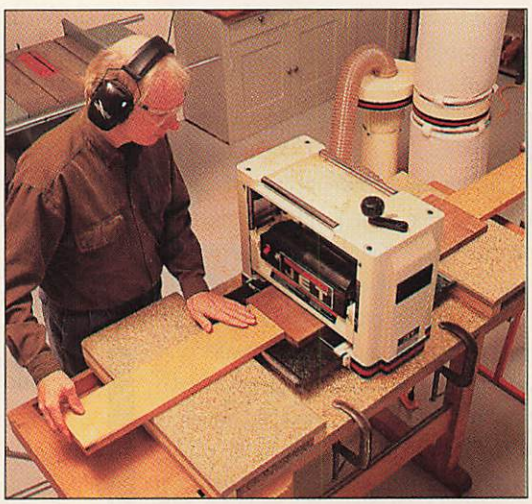
The board is cut evenly when both rollers are engaged and the cutterhead is level.

Snipe at the end of a board is produced by a backward tilt of the cutterhead assembly.

Snipe *can* be beat.

Here's how:

- **Call a truce and live with it.**
  Cut your rough stock 5 in. longer than necessary and trim off the ends when you're done planing.
- **Feather the ends by hand.**
  Use a belt sander, hand plane or scraper to remove the sharp transition from the sniped end to the rest of the board.
- **Outwit your planer.**
  Take advantage of the fact that the planer won't snipe in the middle of a board (Fig. A). Make a train of many boards that are all exactly the same thickness and pass them through the planer one after another (photo at right). Only the lead board and the last trailing board, which can both be scrap wood, will be sniped by the planer. If your boards are fairly short, you'll need a helper to catch the boards as they come out of the machine. You'll have your hands full feeding the other end.



A TRAIN OF BOARDS will banish snipe from your good wood. The trick is to fool the planer into thinking it's cutting one very long board by feeding many boards through in one operation, each butted up to another. Infeed and outfeed supports that are precisely level with the main bed of the planer keep individual boards from drooping.

What a Portable Planer Cannot Do

■ It isn't a jointer.

Planers don't make wood flat. Surprised? It's a common misconception that you can shove a piece of rough lumber into a planer and get a flat board out the other end. Unfortunately, it doesn't work that way.

Like the saying goes, "garbage in, garbage out." If you put a cupped, twisted, or bowed board into a planer, you'll get approximately the same shape board out the other end.

Use a jointer first to flatten one face of a board. Then put the board in the planer, face down. A planer's job is to make the second face parallel to the face you jointed. Jointers and planers work hand-in-hand. Both are basic tools if you work with solid wood, especially if you want to save money in the long run by starting with rough lumber.

■ It can't hog off wood.

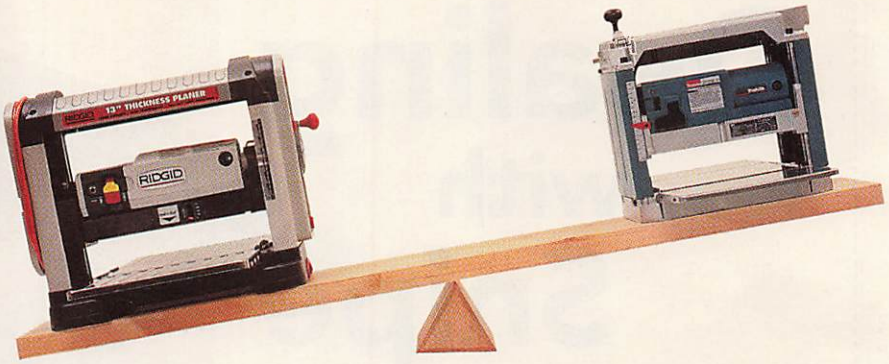
Portable planers aren't as powerful as their stationary counterparts. You can't hog off 1/8 in. from wide boards. In order to avoid tripping your circuit breaker or overheating the motor, you need to listen to the machine as it cuts. Portable planers work best with very small bites, like 1/32 in.

■ It won't be set up right from the box.

The convenient fold-up infeed and outfeed tables of a portable planer come at a price. You have to carefully level them with the main bed before the machine is ready to go. It's a tedious adjustment on every machine.

Due to manufacturing differences, some machines come with a cutterhead that isn't precisely parallel with the main bed. Whether yours will be perfect is in the luck of the draw. The cutterhead may be a few thousandths of an inch off over its full width and make a board unequal in thickness from side to side. Most manuals describe how to level the cutterhead (see chart, next page).

Photo 5



SOME PLANERS ARE MUCH HEAVIER THAN OTHERS. The lightest, the Makita 2012NB, weighs in at 62 lbs., while the heaviest is the Ridgid TP1300 at 84 lbs. All have carrying handles.

(continued from p. 84)

width. It helps to gang them together in a bunch and put them through the planer as a group. For example, you can use your planer to clean up the edges of face frame stock that have been ripped on the tablesaw.

There's a 20-lb. difference between the lightest and heaviest portable planers (Photo 5 and chart, next page). Weight is an important consideration if you store your planer on the floor and must lift it up onto a workbench for use. It's easier to store your planer on a shelf or in a cubbyhole that's the same height as the workbench. This way you won't have to lift it up or down, but merely move it sideways. If your storage space is tight, check out the wide range of planer sizes (Photo 6 and chart, next page).

Dust Collection

You must have good dust collection to plane the smoothest surface on your wood. Without adequate suction, chips carried around the cutterhead can be compressed between the outfeed roller and the planed board resulting in an indented or bruised surface. That's particularly a problem with soft woods like pine.

Use a 650 CFM (cubic foot per minute) or greater dust collector and a 4-in. hose. All the planers we tested have optional dust hoods. They cost about $30 to $40 extra, but are well worth it. Planers make a tremendous amount of wood chips. If you don't have a separator, check your bag often. It can fill up before you know it. AW

Editor's Note: New planers from Craftsman, Ryobi and Tradesman are due on the market this spring. They were not available for our test.

Photo 6



PORTABLE PLANERS FOLD UP into a compact package, perfect for stowing away in a small shop. The Lobo CT-318 is among the smallest and the Ridgid TP1300 is the largest.

	MODEL	SPECS			MAJOR FEATURES				COMMENTS	MINOR FEATURES	CONTACT
		STREET PRICE	WEIGHT	SIZE (HxWxD with chip deflector)	HEAD LOCK	CHIP-DEPTH INDICATOR	PRE-SET STOPS	TYPE OF KNIVES			
✓	Delta 22-560	$330	65 lbs.	16x22x13	Yes	No	No	Indexed DED	Compact, easy knife change	A, J, K, L, M	(800) 438-2486
✓	DeWalt DW733	$400	81 lbs.	18x21x15	Yes	Yes	Yes	SER	Well-designed features	A, C, D, E, G, J, K, L, M	(800) 4-DEWALT
✓	Ridgid TP1300	$400	84 lbs.	20x26x18	Yes	Yes	Yes	DED	Well-designed features	A, B, C, D, E, G, J, K, N	(800) 474-3443
$	Delta 22-540 Type 2	$270	64 lbs.	16x21x15	No	No	No	DED	Basic model	A, J, K	(800) 438-2486
	Grizzly G1017	$370†	78 lbs.	18x22x13	No	No	No	SER	Durable steel construction	Bx2, F, H	(800) 523-4777
	Jet JWP-12-4P	$325	70 lbs.	19x22x15	No	No	No	DER	Basic model	A, F, H,M	(800) 274-6848
	Lobo CT-318	$360	65 lbs.	18x20x14	No	No	No	SER	Very compact	A, F, H, P	(800) 786-5626
	Makita 2012NB	NA	62 lbs.	16x19x13	No	Yes	Yes	DED	Very legible features	A, C, D, E, J, K, L	(800) 4-MAKITA
	Powermatic 412	$360	70 lbs.	19x22x14	Yes	No	No	Indexed DED	Easy knife change, large tables	A, E, F, H, L, M	(800) 248-0144
	Hitachi P12R	$900	75 lbs.	21x20x20	No	Yes	No	SER	Fixed head	A, J, K, L	(800) 706-7337
	Makita 2030SZ	$1,300	79 lbs.	21x21x23	No	Yes	No	DED	Fixed head	A, J, L	(800) 4-MAKITA

✓ Editor's Choice
$ Best Buy
† Includes stand
NA Not Available

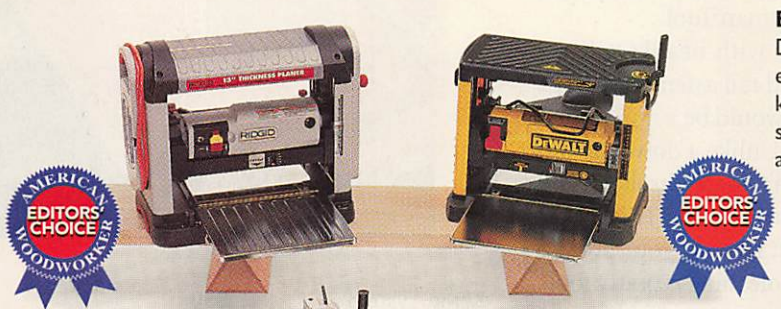
Style of knives:
DED Double-edged, disposable
SER Single-edged, resharpenable
DER Double-edged, resharpenable

Guide to Minor Features

A 4-in. dust port
B 2-in. dust port
C Scale on crank
D Paddle-style switch
E Tables longer than average
F Rollers on tables
G Cord and tool storage
H Adjustment for setting
J Legibility of scale above average
K Manual above average
L Easy-to-tighten knives
M 12-1/2-in. wide capacity
N 13-in. wide capacity
P Cutterhead assembly rides on the case, not 4 posts

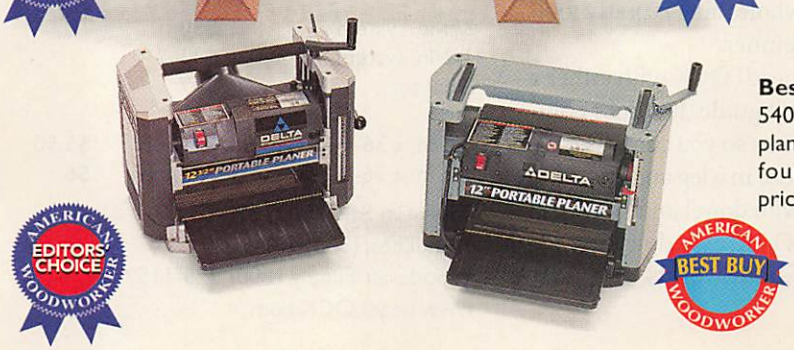
Our Favorites

Editors' Choice: The Ridgid TP1300 is available at Home Depot. It's a large machine but loaded with well-designed features such as a convenient-to-reach cutterhead lock.



Editors' Choice: The DeWalt DW733 features easy-to-read scales, thick knives that can be re-sharpened and a lever-action cutterhead lock.

Editors' Choice: The Delta 22-560 combines a cutterhead lock, small size for compact storage and indexed knives that are easy to change.



Best Buy: The Delta 22-540 Type 2 is a no-frills planer and can often be found at a discounted price.

Product Reviews

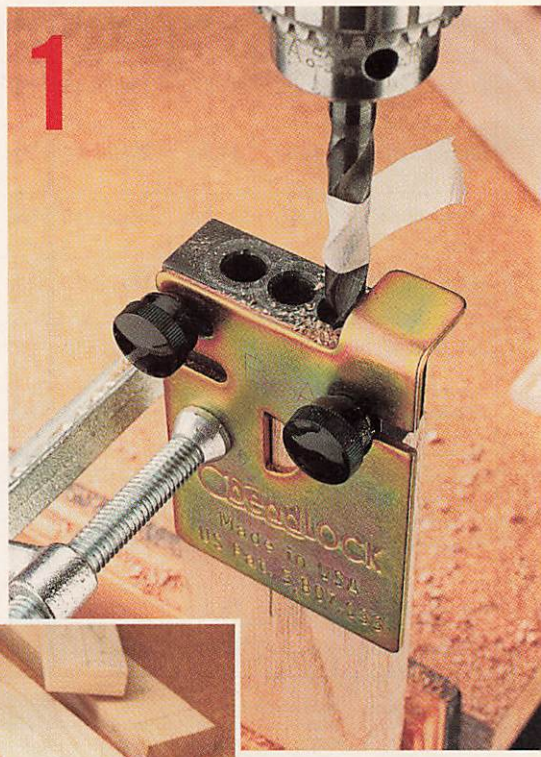
Better than Dowels?

If you're looking for a strong, simple joinery system, here's a simple answer: beadLOCK. All you need is a drill.

This jig allows you to drill a series of overlapping holes in each of the mating parts. The parts are joined with inexpensive premolded tenon material available from the manufacturer, Journeyman Tool.

I had great success with beadLOCK on face frames and leg and rail assemblies. I figured a brad-point bit would be a must, but a twist bit worked fine. Unlike a doweling jig, the beadLOCK doesn't center itself on the material, it registers from one face. This makes it easy to keep the best faces of your project parts lined up. The whole thing is pretty foolproof, even for a beginner.

You can buy the beadLOCK with either a 3/8-in. or 1/2-in. drill guide. It comes complete with a set of shims so you can offset the mating parts, like those in a leg and rail joint. If you want to stick with dowel joints, you can also use the beadLOCK as a doweling jig. You get the best of both worlds, at a price that's hard to beat.



Set the beadLOCK to your layout lines, clamp it to your work and drill three holes. Tape on the bit ensures uniform depth. The jig's configuration prevents using a stop collar.



Slide the drill guide to the second position and drill two more holes.

3/8-in. system	$30
1/2-in. system	$33
Dual set	$47

3/8-in. x 36-in. pre-molded tenon	$5.50
1/2-in. x 36-in. pre-molded tenon	$6

Tools On Sale, (800) 328-0457
Trendlines, (800) 767-9999
Woodcraft Supply, (800) 225-1153
www.beadLOCK.com

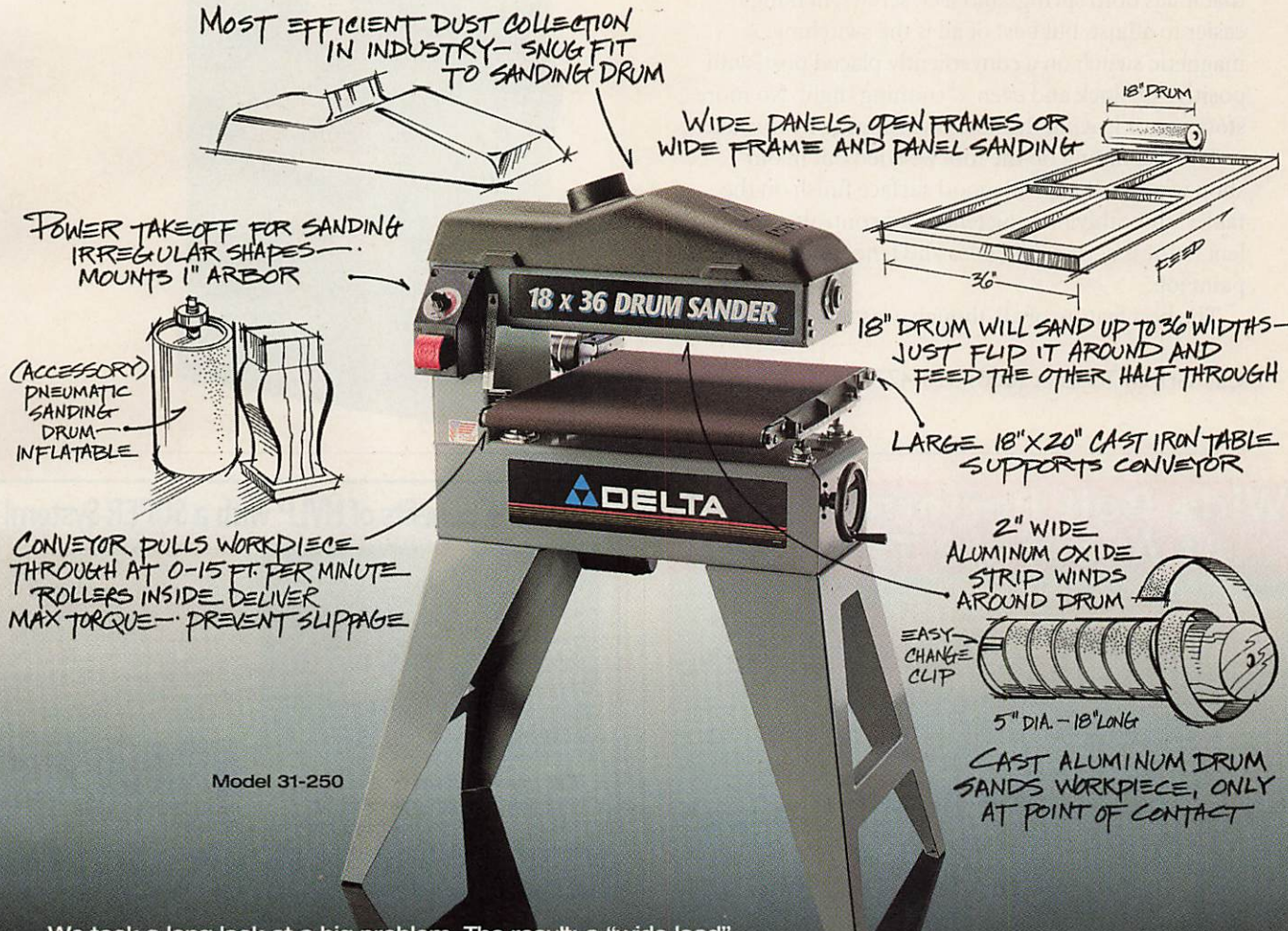


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Grizzly has a new 6-in. jointer that's loaded with features, at a very attractive price.

It has a 47-in. table, a 4x29-in. fence and a 1-HP motor (most jointers this size have 3/4-HP). The knife-setting system is unique in that it has both springs and jack screws, making it easier to adjust. But best of all is the switching: A magnetic switch on a conveniently placed post, with positive off-lock and even a "running" light. No more stooping or leaving the machine running by mistake.

The machining on the tool we tried out in our shop was excellent, with good surface finish on the tables, smoothly moving fence and controls, excellent flatness across the tables and fence and a tough paint job.

The best feature of all, though, was the price: $445.

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Quiet Shop Vacuum

Never thought you'd see those words in the same sentence, did you? Fein says their new Mini-Turbo is one of the quietest vacuums out there. Use it like you would any wet/dry vacuum, without losing your hearing.

Fein has been making a great shop vacuum for about three years; their model 9-55-13. If you've been eyeing that one, but holding off because of price, have a look at the Mini-Turbo. This scrappy little brother offers similar features, including the same motor, for only about $150.

You can connect the Mini-Turbo directly to power tools for great pick up right at the source. "By-pass construction" means the motor won't overheat even when the vacuum is constricted by small ports on portable tools.

The Mini Turbo has:

- a 6-gal. barrel
- a 10.5 foot hose (longer than most)
- a floor nozzle, crevice tool and upholstery tool
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However, it does not have the tool-actuated switch that the 9-55-13 has.

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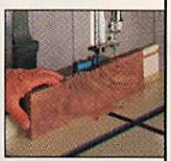


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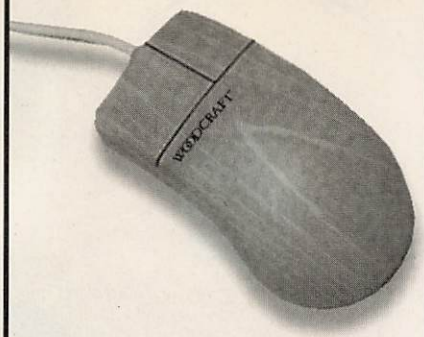
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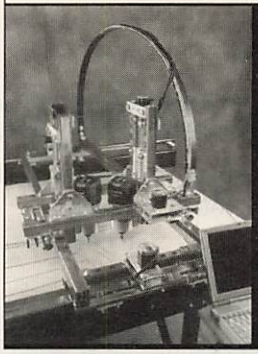
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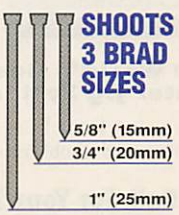
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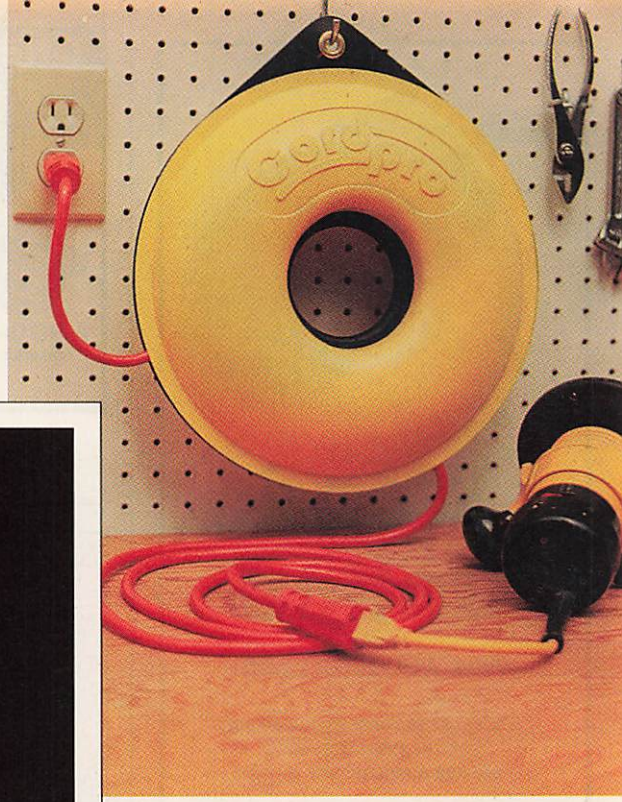
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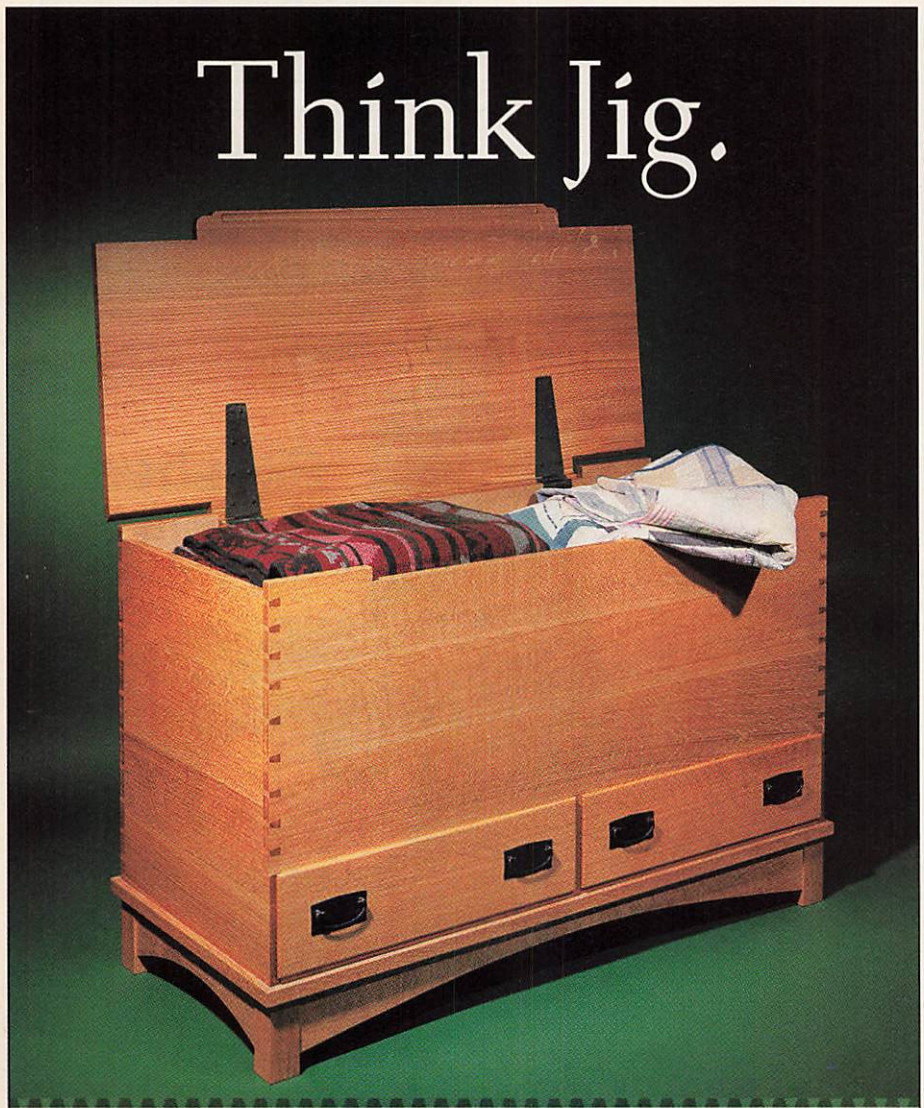
Tired of having a rats' nest of cords laying around? Getting a $10 Cordpro in your life can help.

This doughnut-shaped reel accepts up to 100 ft. of 16/3 cord, 80 to 100 ft. of 14/3 and 50 to 70 ft. of 12/3. The manufacturer says it'll even take 50 ft. of 1/4-in. air hose. You can unwind either end. It's as simple as plugging in one end of the cord, putting the Cordpro on the ground and pulling the opposite end. You can also hold the Cordpro in your hand and selectively unwind either end. Winding the cords back on is just as simple: Grab the doughnut hole and start winding the cord.

The Cordpro is made from tough HDPE plastic; the same stuff pickup truck bed liners are made from. An interior divider is the key to keeping cords neatly coiled.

There's an important safety factor to remember when using the Cordpro. Using any extension cord while it's coiled up can create excessive heat, melting insulation on the wires. Yes, it *does* happen! Follow the amperage recommendations that are included with the Cordpro to make sure you're using it safely.

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Green Wood Stabilizer



I like turning bowls from green wood. I go out to the back 40, cut myself a sizable chunk of wood and go to it. What I don't like is when the finished product cracks so badly I can see through it. Pentacryl, from Preservation Solutions, is the answer for turners, carvers or anyone who wants to stabilize green wood.

Pentacryl is a polymer compound that soaks into wood. It can be brushed or sprayed on, or you can immerse the wood in a bucketful. Immersion gives you the best results. Use the stuff right out of the bottle—no mixing is required. And unlike PEG, it's a liquid at room temperature; so no heating is required. Total time for complete absorption depends on the wood, but plan on about one day of immersion per inch of material thickness. Once it's into the wood, Pentacryl stabilizes the wood cells to reduce or eliminate both warping and cracking.

The manufacturer says they haven't found a finish yet that won't stick to Pentacryl—another advantage over PEG. The stuff is considered non-toxic, but isn't registered as food grade. Plans are in the works for a food-grade version.

32 oz. bottle; $15
gallon; $45
Call Preservation Solutions (207) 563-5414

TECHNOLOGY UPDATE

Computerized collar creates world's first radio-controlled dog?



Small U.S. company develops technology that uses radio waves and a microprocessor on your dog's collar to replace expensive fencing, cruel chains and leashes...keeping your dog safe and free!

by Guy Yeadon

The PetSafe Instant Fence gives you the ability to set up a safe and secure area for your pet to play, without the time and expense conventional fences. Most fences can cost thousands of dollars and can affect the appearance of your property. In many new neighborhoods, they aren't even allowed. Electronic fences that use wires and special collars can cost nearly as much to have professionally installed, usually well over a thousand dollars. PetSafe Instant Fence is a revolutionary new concept that is clearly the best value in pet containment.

Safe, secure and totally portable. This is the safest, most secure fence you can buy for your pet. It is far superior to alternative containment methods, because there are no wires to bury and because the pet cannot "run through" the warning zone. When the collar picks up the signal from a buried wire, a stubborn or poorly trained dog can learn to break out. With PetSafe Instant Fence, there is no "other side" to run to, since the only safe area lies inside the containment circle. Compared to conven-tional fences, which dogs can jump over or dig under...PetSafe Instant Fence is unbeatable. What's more, it's totally portable. You simply unplug it and take it with you to your new house, while visiting friends or even while traveling. No more ties, cages or boarding costs—your pet can enjoy vacations as much as you.

The humane solution. PetSafe Instant Fence will provide greater happiness and freedom for you and your pet. No more cages, dog runs or tie-outs. No more waiting for you to go for a walk on a leash. Your dog will be able to run and play throughout the yard.

Easy installation, simple training. PetSafe Instant Fence emits a radio signal that extends up to 90 feet from the transmitter. While the signal area forms a circle, you can adjust it to keep your pet in your yard. The system has a variety of safety features to protect your dog. Patented coding in the software prevents any accidental electric pulse in the event of a power shortage. The boundary area remains stable, never fluctuating with disturbances within the signal area. If your pet is poorly trained and gets out of the containment area for over 30 seconds, the correction pulses will cease and the receiver will revert to a beep. Training is simple and a video is included to walk you through the process. Once you have adjusted the signal to the desired strength, mark the boundary by placing the small training flags at the edge of the signal area. The training takes only minutes a day, and dogs generally learn their boundary within a few weeks. After thirty days, you can begin to remove the flags gradually.



It's risk-free...and only Comtrad has it. Why wait to take advantage of this breakthrough technology? PetSafe Instant Fence comes with a one-year limited warranty from Radio Systems, and it's backed by Comtrad's exclusive risk-free guarantee. Try it for yourself, and if you are not satisfied, simply return it within 90 days for a full "No Questions Asked" refund.

Exclusive limited time offer! Order today and get a factory-direct discount on PetSafe

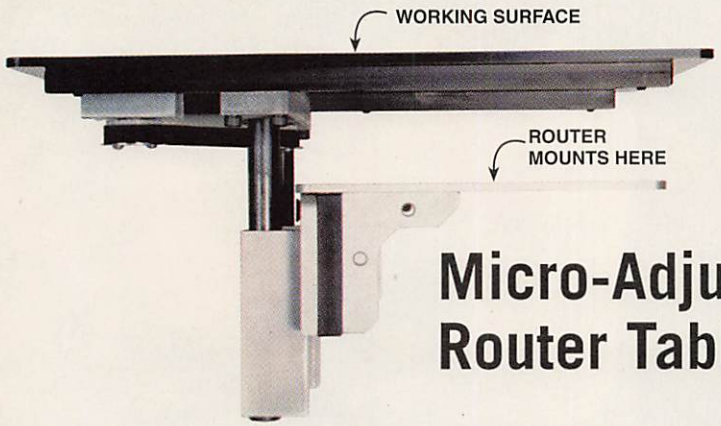
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Micro-Adjust for Router Tables

Every time you adjust the bit in your router table you have to bend over, reach under the table, unlock the router, make the adjustment, lock the router, stand up and make a test cut. Then you start the process all over again. What a pain.

This unique new device from JessEm, the Rout-R-Lift, eliminates all this hassle. You can adjust the router bit height from the top, in very small increments.

With the Rout-R-Lift your router travels up and down in a carriage. To adjust the bit height, you insert a small crank into a hole in the top of your table, and turn. The carriage travels a total of 2-1/2 in. Each revolution of the crank gives you 1/20 in., which allows very fine adjustments. When the height is correctly set, remove the knob.

The main plate on the Rout-R-Lift is made from anodized aluminum and is 3/16 in. x 11-3/4 in. x 14-3/4 in. You'll have to set this plate into your router tabletop. If you need to use your router hand held, JessEm says it's easy to remove your router from the mechanism. This is a *very* handy device, with only one drawback—the $220 price tag.

JessEm Tool Company
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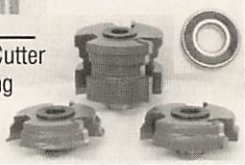
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It's an ABC extinguisher, so it's good for fighting wood, liquid and electrical fires. Kidde says the foam is easier to use for those of us who aren't fire fighting professionals. It leaves a film on combustibles that helps prevent re-igniting, something other extinguishers don't do.

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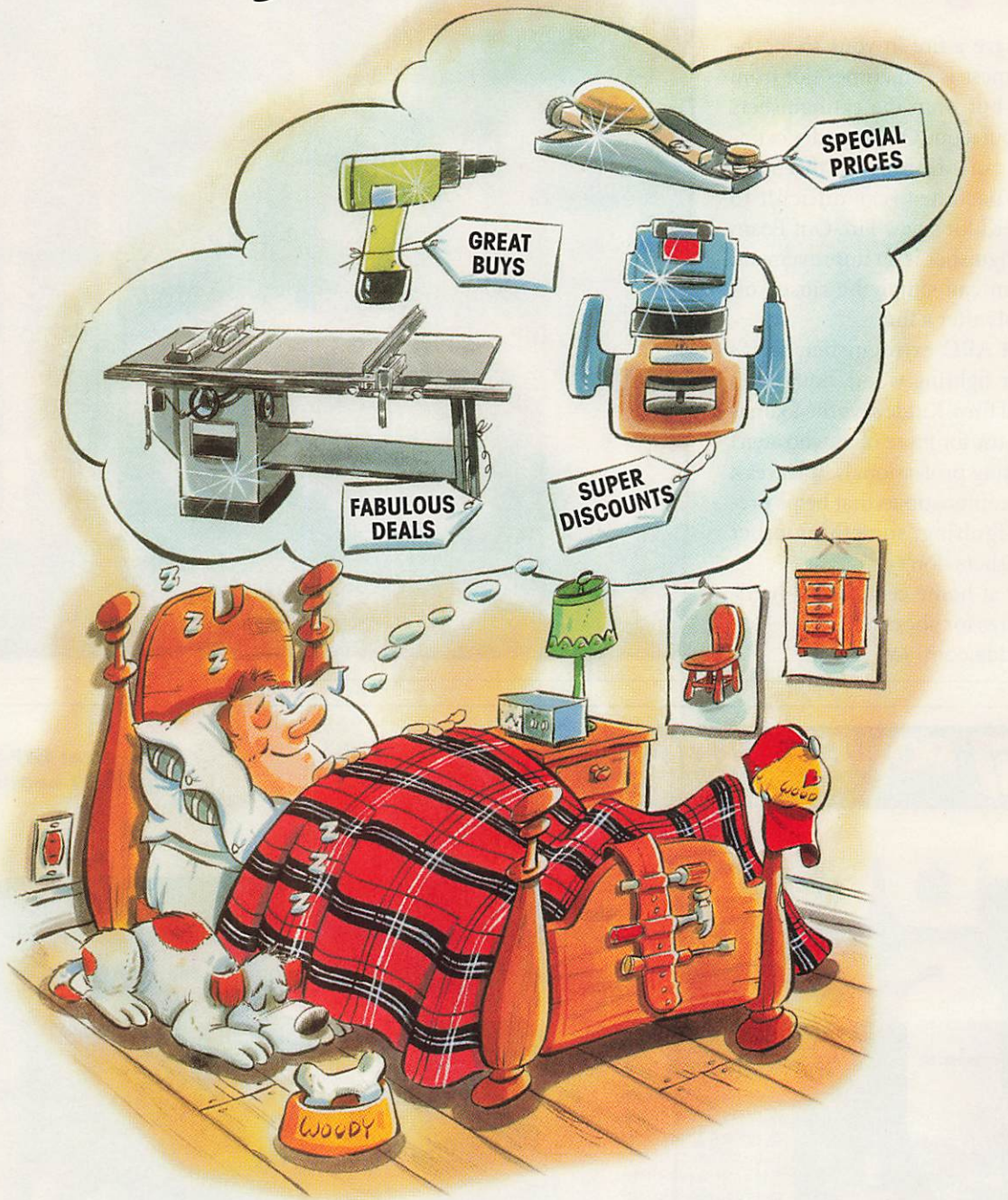
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Finish a Picture Frame
Michael Dresdner
Fri., 9:00-11:00 am; Sat., 9:00-11:00 am
Sun., 2:00-4:00 pm
Learn how to work with shellac and custom stains, and how to "dry brush". Take home a picture frame that you finish. Capacity: 24. **Cost including all materials: $65.**

Build a Whittled Peg Rack
George Vondriska
Fri., 9:00-11:00am; Sat., 9:00-11:00 am
Sun., 11:30-1:30pm
This butternut wall-hung coat rack appeared in AW issue, #73. Make one at the show and use it to hang your favorite fedora. Capacity: 12. **Cost including all materials: $75.**

Make a Hinge Mortising Jig
Carol Reed
Fri., 9:00-11:00 am; Sun., 11:30-1:30
Make and keep a great jig for routing hinge mortises in your boxes and cabinets. You will also get a set of hinges and learn to install them using the jig. Capacity: 20. **Cost including all materials: $60.**

Make Your Own Clamps
Fred Matlack
Fri., 2:00-4:00 pm; Sat., 9:00-11:00 am
Sun., 2:00-4:00 pm
Handmade from wood and aluminum, it will last forever. Take the pair home to use on your next project. Capacity: 20. **Cost including all materials: $60.**

Make a Mahogany Jewelry Box
Frank Klausz
Fri. & Sun., 2:00-4:00 pm
Learn to layout and cut dovetails by hand. Use tools sharpened by Frank, and then complete the jewelry box at home. Capacity: 12. **Cost including all materials: $75.**

Make the Jig that Makes Jigs
Carol Reed
Sat., 2:00-4:00 pm
Customize a plastic marking gauge to suit your router. Then, take the gauge home and use it in your shop to make other new, very accurate woodworking jigs. Capacity: 20. **Cost including all materials: $65.**

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Saturday 10-6
Sunday 10-5

KIDS' PROJECT WORKSHOP

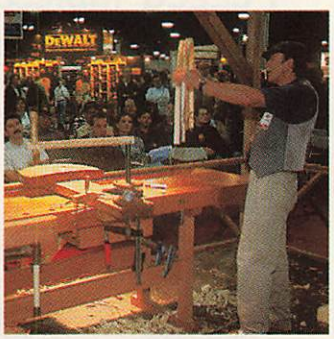
Enjoy the fun of woodworking through the eyes of your children or grandchildren. They will receive a Junior Achievement certificate, a keepsake and a memory that will last a lifetime!

PLUS Sunday is Family Day bring the whole family for $15.00!

Why just Dream about polishing your woodworking skills or carving out a great deal on that new tool you've been after? Wake up and smell the freshly sawn wood at **THE AMERICAN WOODWORKER SHOW™...All New, Expanded and Better than Ever!**

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ANTIQUE TOOL ROAD SHOW: Free appraisals by **Clarence Blanchard,** Editor to Fine Tool Journal and "the antique tool authority". Bring your old tools to the show.

Sharpen and Use a Cabinet Scraper
George Vondriska
Sat., 2:00-4:00 pm
Learn how to properly sharpen and burnish a cabinet scraper, and how to use it for smoothing woods. Take home the scraper and burnisher. Capacity: 15. **Cost including all materials: $60.**

Sharpening
Paul Anthony
Sun., 11:30-1:30 pm
Learn how to put a truly keen edge on your chisels and plane irons. Bring a couple of your favorite tools for a serious tune-up. Take home a sharpening aid. Capacity: 12. **Cost including all materials: $60.**

SEMINARS

$5 Each! Tickets available only at box office.

Woodworking Fundamentals
Frank Klausz
Fri., 11:30 am-1:00 pm; Sat., 1:30-3:00 pm
Learn how to select and understand tools, machines and materials. Choose projects and joinery you can handle. Allow for wood movement. Use the proper glue.

Tablesaw Basics, Fred Matlack
Fri., 11:30-1:00 pm; Sat. 3:30-5:00 pm
Learn how to use it safely and efficiently for ripping, crosscutting, dadoing, and other essential woodworking operations.

Making and Fitting Cabinet Doors
Paul Anthony
Fri. & Sat., 1:30-3:00 pm
There's nothing more important to the look of a cabinet than its doors. This design tour of cabinet door styles will include a demonstration of construction and installation techniques.

Getting Started with your Router
Carol Reed
Fri., 1:30-3 pm; Sat. 11:30-1:00 pm
For anyone new to routing. Learn how to rout safely and successfully. Discover which routers, bits, and aftermarket jigs and fixtures will work best for you.

Finishing Secrets
Michael Dresdner
Fri., 3:30-5:00 pm; Sat., 3:30-5:00 pm
Learn how to select the best finish for the job. Understand wood stains and use them correctly. From surface preparation to final polish, you'll know what it takes to get a professional finish.

Tablesaw Tips and Tricks
Andy Rae
Fri., 3:30-5:00 pm; Sat., 11:30am-1:00 pm
Tired of wobbly cuts and wasted wood? Want to know the safe way to saw? Learn 4 savvy steps, from simple tune-up procedures and safe sawing methods, to jigs that improve your skills and accessories the pros use.

Edited by **Dave Munkittrick**

Small Shop Tips





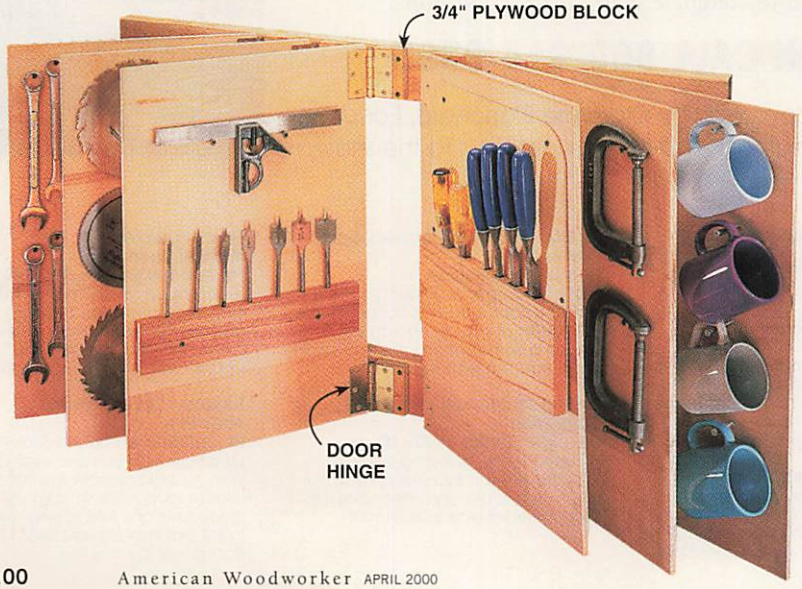
Pegged Tablesaw Tools

For a nifty way to keep tablesaw accessories in reach, attach perf-board panels to the tablesaw stand. Drill holes in the legs of an open metal stand and bolt the perf-board in place.

Tablesaw Worktable

Turn your tablesaw into extra workbench space with a piece of 3/4-in. plywood. Attach wood strips around the plywood edges for a snug, no-slide fit on the metal table.

Caution: Always crank the blade below the surface and unplug the tablesaw before using it as a workbench base.



Tool Storage Book

Put a ton of tools up on the wall in this tool "book." Hang 1/2- or 3/4-in.-thick plywood "pages" 4 in. apart on horizontal 2x4s with 3-in. door hinges. Screw and glue 3/4-in. plywood blocks between the hinges and the 2x4s so the pages can pivot without binding. The pages shown here are 16 in. wide by 24 in. long—build yours whatever size you need.

ART DIRECTION: PATRICK HELF • PHOTOGRAPHY: KRIVIT PHOTOGRAPHY

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Our 100-page, full-color hardware catalog greatly expands our hardware offering. There are significant additions to our current product categories, as well as many new ones. Extensive copy explains the benefits and uses of each piece. With hardware ranging from classic to modern, this catalog has the answers to your project needs.

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3X24	.93
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6X48	3.50
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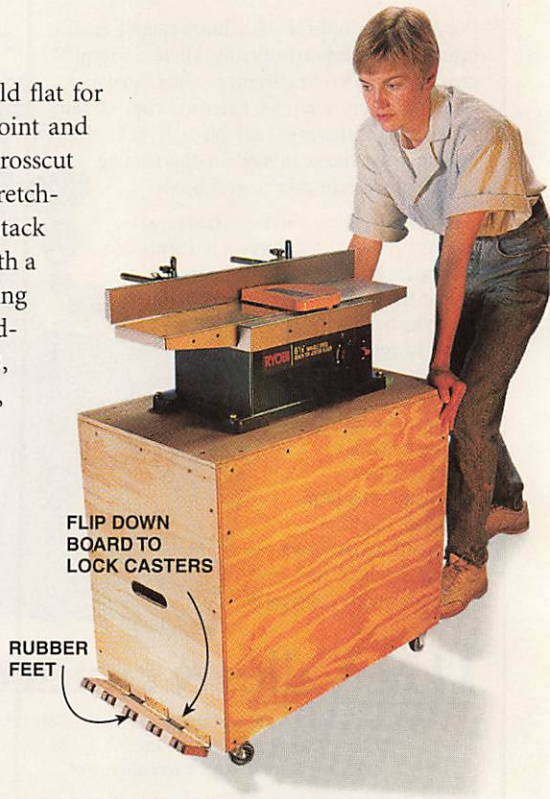
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These sawhorses are sturdy *and* they fold flat for easy storage. Building them is a snap: joint and plane 2x4 stock to 1 in.; then rip to 3 in. Crosscut at 30 in. for the legs and 18 in. for the stretchers. Use a biscuit joiner and double stack #20 biscuits at each joint. Assemble with a 1-1/2-in. continuous hinge and locking table leg braces (available from Woodworker's Hardware, 800-383-0130, hinge, #LA11248 14A, $5.78; leg brace, #SO446/14 2C, $19.04 per pair).



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This plywood stand for power tools is compact and mobile. To lock the stand in place, just flip down the hinged board at the base.

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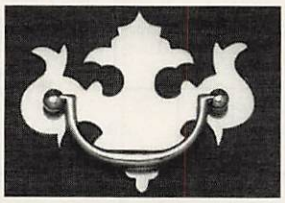
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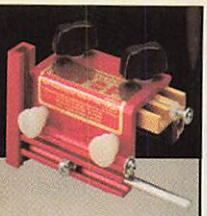
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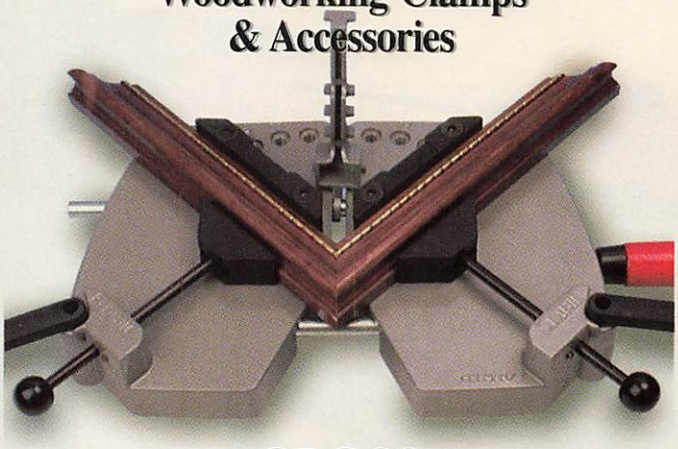
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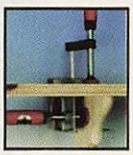
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7 1/4" to 16" diameter available

Cuts melamine **PERFECTLY**. 220 mm & 300 mm available. Our best **PLYWOOD** blade. 8", 7 1/4" & others available

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10" x 80 T (1/8" or 3/32" K)	~~$159~~	$143	$127
12" x 80 T (5/8" or 1" hole, 1/8" K)	~~181~~	163	145
14" x 80 T (1" hole)	~~197~~	177	158
14" x 100 T (1" hole)	~~326~~	203	181
16" x 100 T (1" hole)	~~243~~	219	194

BUY ONE & SAVE - BUY MORE & SAVE MORE

Buy any sawblade or dado in this ad and save 10% off the sale prices. Buy additional sawblade(s) or dado(s) and save even more—15% to 20%! Sale good through June 30, 2000.

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All-purpose—tablesaws and portable circular saws.
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EDITOR'S CHOICE AND TOP RATING OVER 18 COMPETING SAW BLADES.

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14" x 40 T x 1"	~~$149~~	$134	$119
14" x 30 T x 1"	~~139~~	125	111
12" x 40 T x 1"	~~129~~	116	103
12" x 30 T x 1"	~~119~~	107	95
10" x 40 T x 1/8" or 1/32"	~~119~~	107	95
10" x 30 T x 1/8" or 1/32"	~~99~~	89	79
9" x 40 T	~~109~~	98	87
9" x 30 T	~~99~~	89	79
*8 1/4" x 40 T x 3/32"	~~99~~	89	79
8" x 40 T x 3/32"	~~99~~	89	79
8" x 30 T x 3/32"	~~89~~	80	71
7 1/4" x 30 T x 3/32"	~~69~~	62	55
**6" x 40 T x 3/32"	~~89~~	80	71
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NEW for *Sears & Makita Table Saws **Saw Boss ***Dewalt Cordless

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6 1/2" to 15" diameter available

Specially designed for sliding compound miter, miter-chop, and radial saws.

	Sale Price	10% Off 1st Blade	20% Off 2nd Blade
6 1/2" x 40 T Delta, Sidekick, & Others	~~$99~~	$89	$79
8 1/4" x 60 T Sears, Delta, Ryobi	~~109~~	98	87
8 1/2" x 60 T Hitachi, Dewalt, Ryobi, FreudTR125	~~119~~	107	95
9" x 80 T Delta & Others	~~129~~	116	103
10" x 80 T Delta, Bosch, Mitachi, Makita, Ryobi, AEG, & All	~~139~~	125	111
12" x 80 T Dewalt, Hitachi, Makita, B+D, Sears, & All	~~149~~	134	119
14" x 100 T Makita, Ryobi	~~189~~	170	151
15" x 100 T Hitachi, Ryobi	~~199~~	179	159

WOODWORKER I

7 1/4" to 14" diameter available

Designed for radial arm or tablesaws—fine crosscut.

	Sale Price	10% Off 1st Blade	15% Off 2nd Blade
8", 8 1/4", 7 1/4" x 60T	~~$109~~	$98	$87
10" x 60 T (5/8" hole)	~~129~~	116	103
12" x 60 T (5/8" or 1")	~~139~~	125	111

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Make all your blades cut better and quieter with a blade stiffener!

4"...$21
5"...$24
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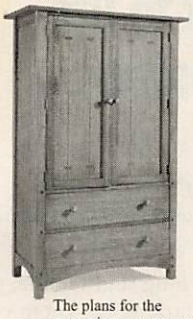
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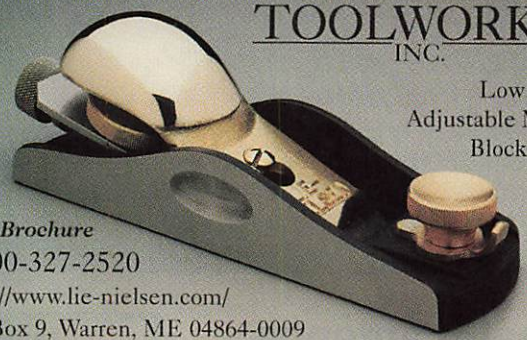
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The plans for the entertainment center and bed are CAD generated with pages of instructions.

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TECHNOLOGY UPDATE

Technology that can change the way you live and work.

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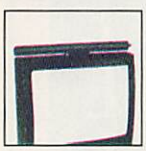
Stealth antenna hides under gutters but performs like big ugly antennas

The new Max Antenna by GE is the low-profile, high-gain way to get flawless reception of broadcast signals without expensive installation.









The Max Antenna by GE is the ultimate TV antenna system.

Electronic engineers agree—your television is only as good as the signal it receives. Both cable and satellite television systems have spent a great deal to improve the quality of their transmission, but they can be extremely expensive, they aren't available in all areas and may not provide access to local TV stations. Luckily, there is a new antenna from GE that will provide breakthrough performance without making your family room look like something out of the fifties.

Clear alternative. The Max Antenna series from GE uses a revolutionary electromagnetic design to maximize installation flexibility and yield longer range reception of off-air VHF and UHF signals. Unlike a conventional dipole antenna, the Max Antenna can receive signals in both vertical and horizontal planes with minimum cross-polarization loss. This design allows for the first low-profile antenna solution that provides numerous installation options.

Superior components. The key to the superiority of this antenna is its ingenious use of the latest electromagnetic technology—providing high gain and full channel coverage as well as the greatest amount of mounting flexibility. First, the antennas were designed around a wide band element to achieve the greatest amount of gain in a relatively small space. Next, an amplifier and matching network was designed to enhance the reception of weak signals. This amplifier also adds very little distortion to the strong signals, giving it a balanced amount of gain. A filter on the amplifier board will allow for good matching between the antenna and amplifier. Special attention was paid to design an antenna-amplifier combination that would be completely compatible with the new digital transmission format. It has been designed for strong signal distortion rejection and a low amount of noise. It is omnidirectional and requires no adjustments, orienting or fine tuning during use. You simply install it, set it and forget it.

The best antenna you'll never see.

Would you rather have the "old-fashioned" unsightly antenna tower or get even better reception with one that you can mount horizontally or vertically.

Risk-free reception. The Max Antenna comes with Comtrad's exclusive risk-free home trial. If you are not completely satisfied, return it within 90 days for a full "No Questions Asked" refund.

Bring a drained battery back to life without opening your hood

The remarkable Auto Starter® eliminates the need for dangerous jumper cables and can provide independent power for a variety of uses.

Imagine this...after a long flight home, you arrive at the airport parking lot, get in your car and turn the key and nothing happens. Guess what? Your car battery's drained. It's cold, dark and you're alone. Do you flag down a stranger and hope he has jumper cables? Do you walk back to the airport, phone a tow truck and wait? No...you simply reach into your glove box and take out your Auto Starter®. You plug it into your car's cigarette lighter and, in a matter of minutes, you're on your way.

A good start. Before Auto Starter, you either had to call a tow truck or try to get a jump from another vehicle. Tow trucks are slow to arrive and very expensive. Jumper cables, even heavy-duty ones, are dangerous and involve getting under the hood. Plus, there has to be another car around to provide the jump. Battery acid can burn your skin and ruin your clothes. If the cables are not connected correctly they can damage your car's expensive electrical system or, even worse, cause an explosion. With Auto Starter, you don't need a jump—you

Years of research and testing result in electro-magnetic pest control breakthrough

PestContro™ uses electro-magnetic and ultrasonic technology to control a variety of pests in your home safely, silently and effectively.

PestContro™ combines electromagnetic technology and ultrasonic waves to solve a variety of household pest problems. This amazing device uses your home's existing electrical wiring to create a shifting electromagnetic field. This creates an environment that is uncomfortable for pests, driving them from their hiding places in walls, ceilings and floors. Simultaneously, a harsh, ultrasonic siren blasts sound from the unit's dual speakers. This sound is inaudible to humans, but it creates an incredible disturbance for pests. In two to four weeks, the pests are driven from the area.

Safe and effective. PestContro is harmless to children and household pets, such as cats, dogs, fish and birds. The unit features a two-setting intensity selector that allows you to adjust the setting for those household pets that may be affected by certain pitches, like lizards, hamsters and gerbils.

Just plug it in. Simply place the PestContro unit in a centrally located area and it goes to work

don't even have to open the hood. You simply plug the unit into the cigarette lighter, wait a few minutes and you're on your way. Leave the unit plugged in for 30-120 minutes while driving and it recharges automatically.



Portable power. Auto Starter has many other uses. It's an independent 12V DC power supply that can operate TVs, radios, cellular phones and laptops. Almost any appliance that runs off of an adapter can operate independently with Auto Starter.

Auto Starter also makes it easier to work on your car. Plug it in before you change the car battery, and you won't have to reprogram your car's clock, radio or alarm system. You wouldn't think of driving around without a spare tire—why not have a spare battery that fits right in your glove box?

Try it risk-free. Considering the cost of a tow, Auto Starter will pay for itself the first time you have a problem. It is backed by a one year manufacturer's limited warranty and Comtrad's exclusive risk-free home trial. If you are not fully satisfied for any reason, return it within 30 days for a full refund, "No Questions Asked."



immediately, using a new technology called "phase-shift-current." By shifting the electromagnetic field throughout the home's wiring, it controls pests in the walls, ceilings and floors, where the majority of pests live. This interference covers an area of up to 5,000 square feet. You can use the intensity selector to customize your control. Lower ultrasonic sounds tend to influence larger creatures, such as rats, lizards, roaches and spiders. The higher setting is more irritating to smaller pests, such as ants, ticks, fleas and other insects. There's even a Floor Night Light for placement in a hall or dimly lit area.

Repel pests from your home...risk-free. PestContro comes with a two-year manufacturer's limited warranty and Comtrad's exclusive risk-free home trial. If you are not satisfied for any reason, simply return it within 90 days for a full "No Questions Asked" refund.

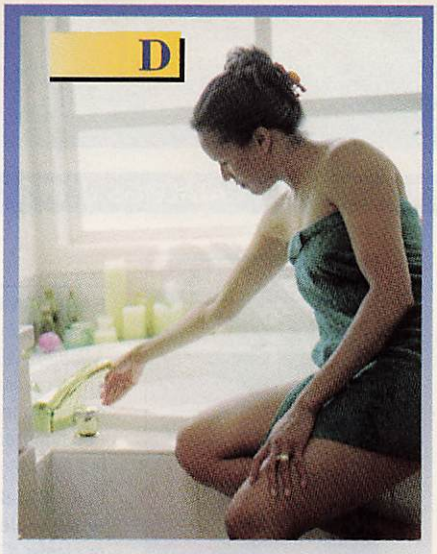
Scientist invents easy solution for hard water problems

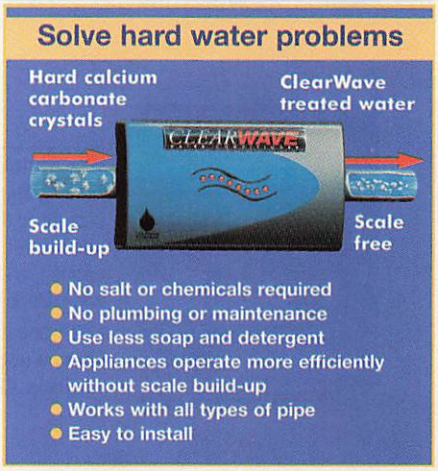
ClearWave is a revolutionary new product that solves your home's hard water problems without salt, chemicals or plumbing.

I recently moved in to a new home, and I was disappointed to find that the water pressure was not as high as at my previous house. One of my neighbors told me the problem was hard water—that our water supply contains lots of minerals, like calcium and magnesium. This causes scales to build up in pipes, appliances, fixtures and even the water heater. I had heard that hard water solutions were costly and inconvenient, so I asked him what he'd done about the problem. That's when he told me about ClearWave, a remarkable water conditioner that helps reduce scale buildup and helps prevent new scales from forming.

An innovative solution. ClearWave uses the latest microprocessor technology to electronically generate inaudible waveforms. They help keep calcium carbonate particles, or scale, dissolved in the water. The water treated by ClearWave continues to dissolve the scale as it flows through the pipes. Over time, it helps solve hard water problems in the entire system, from the water heater and pipes to appliances and shower heads. This will result in a variety of benefits for you and your home. You'll find yourself using less soap and detergent, and your appliances will operate more efficiently. ClearWave works with all types of pipe and installs easily with ordinary household tools.

No salt, no chemicals, no plumbing. Pure water contains nothing but H_2O. When it comes out of the ground, however, water is rich in a multitude of minerals, such as calcium and magnesium. One method of dealing with hard water involves using magnets and electrostatic devices to cause electrical changes in the water that affects the scaling characteristics of the minerals. This method is similar to that used by ClearWave, with an important difference. The electric field generated by ClearWave is continually applied to the water, while a magnetic field relies on the movement of the water to produce the changes.





What will happen. As soon as it's installed, ClearWave immediately starts to loosen existing scale in both the hot and cold water systems. One immediate result you'll notice is that soap will lather more easily. After five days, the scale will begin to break down and come off water heater elements and tanks.

Try it risk-free. Why put up with the mess and hassle of hard water deposits when there's a simple, affordable solution. ClearWave comes with a three-year manufacturer's limited warranty and Comtrad's exclusive risk-free home trial. If you are not satisfied for any reason simply return it within 90 days for a full "No Questions Asked" refund.

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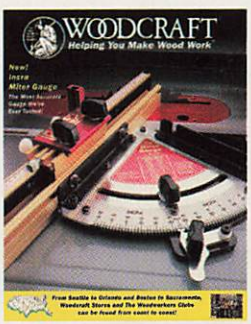
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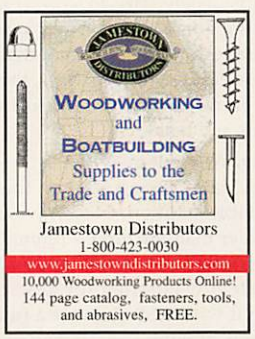
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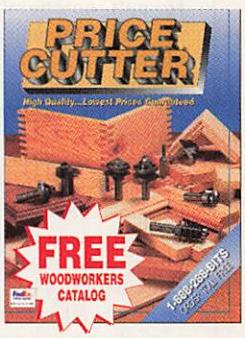
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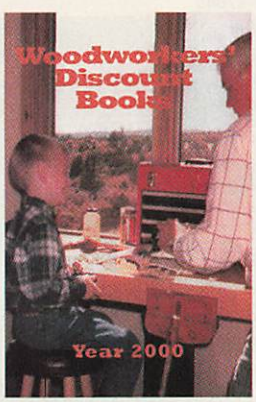
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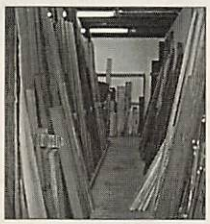
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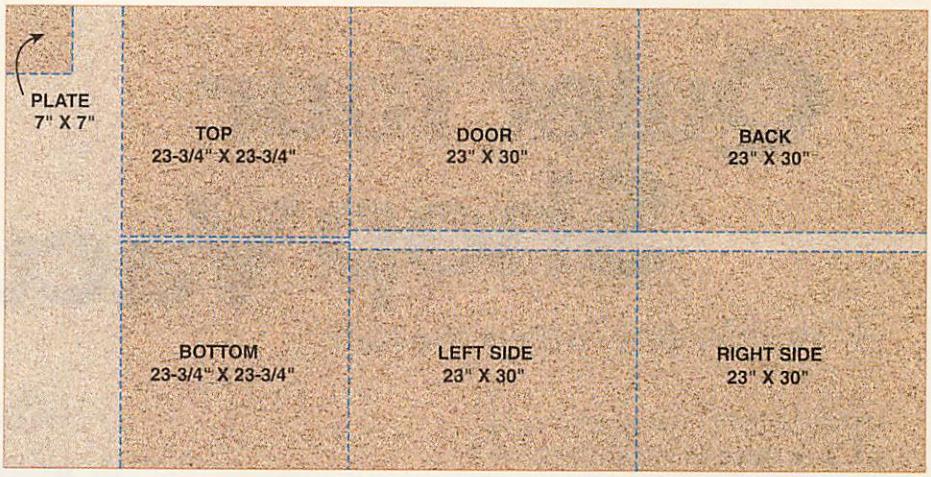
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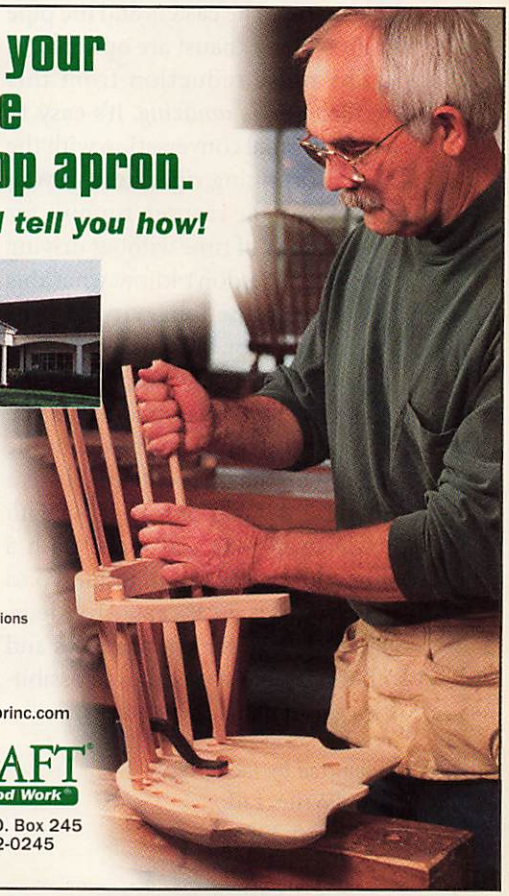


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Quiet Your Shop Vacuum

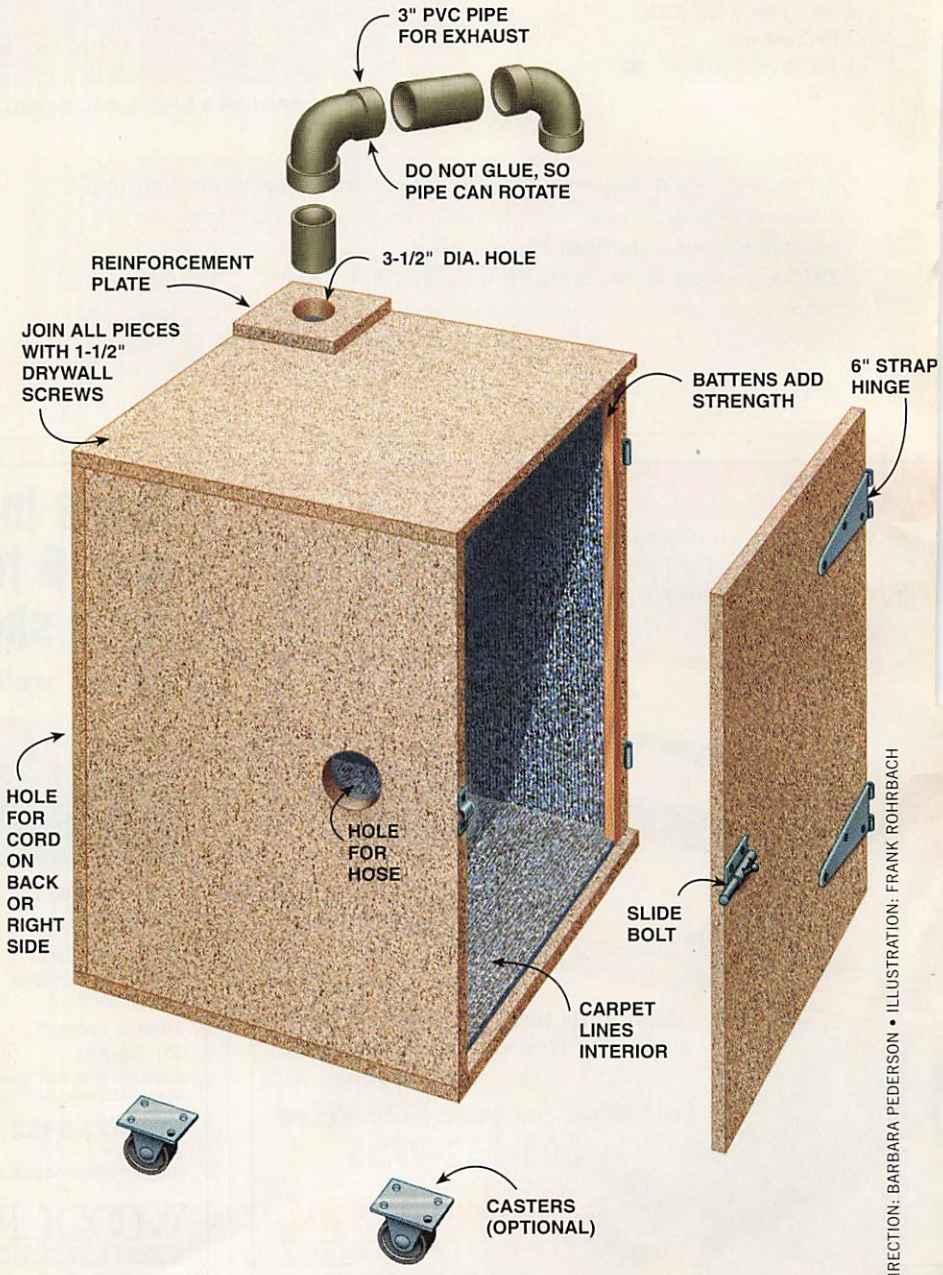
A "muffler box" tames the roar.

This solution was sent to us by Jack Beste, President of WoodWrite, a company that makes automated pen lathes. His customers spend hours turning exotic woods, using a shop vacuum for dust control. The noise was terrible.

The solution they've come up with is what we call a muffler box. It's dirt simple, dirt cheap ($40), but man, does it work! It's just a box, made from plywood or MDF, lined with old carpet and fitted with an exhaust hole on top. The casters and the pipe to direct the exhaust are optional.

The noise reduction from this muffler box is *amazing*. It's easy to have a normal conversation with the vacuum running right next to you, and to have the vacuum running for long periods of time without driving you batty. We don't know what this box does to the longevity of your vacuum's motor, but we have reports of people having their vacuum going all day long for days without ill effect.

You could build this box with the exhaust on the side so it doubles as a rolling worktable, or trick it out with holders for hose and tools. With a small $40 shop vacuum inside, you'd have yourself an inexpensive dedicated vacuum for your sanders and other portable power tools. Possibilities galore. This thing works.



ART DIRECTION: BARBARA PEDERSON • ILLUSTRATION: FRANK ROHRBACH

Submitted by Jack Beste.
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